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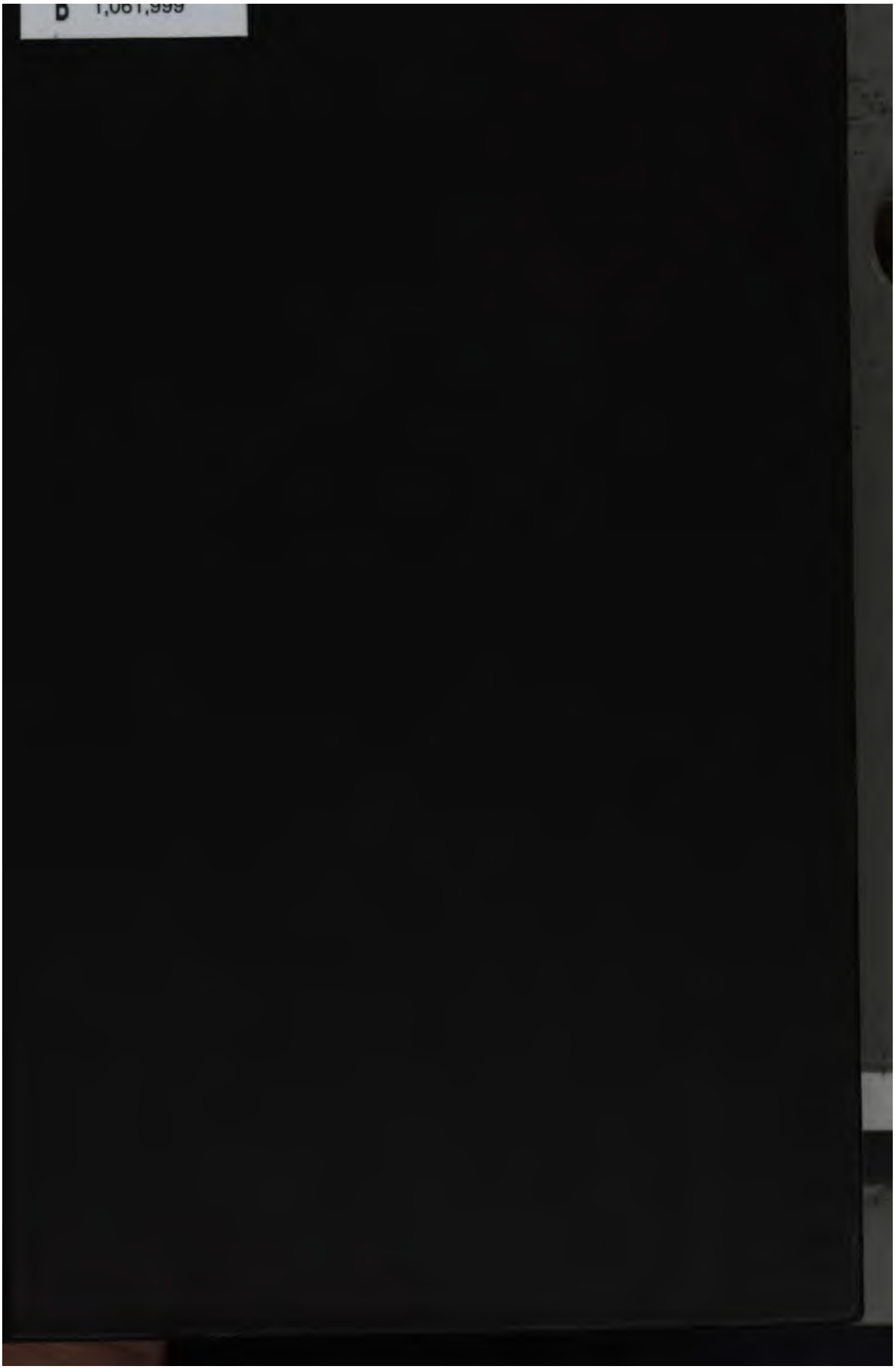
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OF THE

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VOLUME II.

(Nos. 11–15.)

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Secretary S. I.

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Article V.—Contributions to the Natural History of Arctic America, made in connection with the Howgate Polar Expedition, 1877–'78. By LUDWIG KUMLIEN. 1879. 8vo., pp. 179. *Bulletin of the National Museum, No.* 15.

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—11—

BULLETIN

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No. 11.

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This work is the eleventh of a series of papers intended to illustrate the collections of natural history and ethnology belonging to the United States, and constituting the National Museum, of which the Smithsonian Institution was placed in charge by the act of Congress of August 10, 1846.

It has been prepared at the request of the Institution, and printed by authority of the honorable Secretary of the Interior.

S. F. BAIRD,

Secretary of the Smithsonian Institution.

SMITHSONIAN INSTITUTION,

Washington, February, 1882.

BIBLIOGRAPHY

OF THE

FISHES OF THE PACIFIC COAST

OF THE

UNITED STATES

TO

THE END OF 1879.

BY

THEODORE GILL.

WASHINGTON:
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1882.

BIBLIOGRAPHY

OF

THE FISHES OF THE PACIFIC UNITED STATES.

PREFATORY.

The scientific literature relative to the fishes of the western coast of North America is of unusually recent, as well as rapid, growth. Nothing exact was known till the present century had far advanced, for the accounts of the earlier writers, such as Venegas, intead of enlightening the reader, convey absolutely false ideas respecting the character of the ichthyic fauna. Exclusive of incidental notices, the beginnings of an ichthyography of the northwest coast were first published in 1831 (but printed in 1811) in the "Zoographia Rosso-Asiatica" of Pallas; a few species from British Columbia were described by Richardson in 1836, while the fishes of California remained absolutely unknown till 1839, when a glimpse, but an entirely inadequate one, was furnished by Lay and Bennett in their notes and account of species collected during the voyage of the English vessel Blossom. A long silence then supervened, and, with the exceptions thus signalized, and the addition by Storer of a single species of *Syngnathus* in 1846, west-coast ichthyography commenced in 1854 with the announcement, by Professor Agassiz, of the discovery of the remarkable family of Embiotocoids. This was speedily followed by numerous communications, by Dr. Gibbons, Dr. Girard, and Dr. Ayres, on new species of fishes, mostly from the Californian waters, but partly from the Oregonian ones. As early as 1858, nearly 200 species had been made known, and the descriptions of most were collected in a general report by Dr. Girard. The main features of the ichthyology of the Pacific slope were then already known; but more recent laborers have not only extended largely our knowledge of species, but added a number of entirely new forms, and thrown much light on the relations of the fish-fauna of that region to others.

The following bibliography is a nearly complete enumeration, in chronological order, of the memoirs and articles of all kinds that have been published on the fishes of the region in question. The chronological order has been determined by the date of reading of the articles

communicated to learned societies. In cases of question of priority, the right depends, of course, on the period of publication; but this is sometimes with great difficulty ascertainable, and motives of convenience have dictated the sequence adopted.

Perhaps some will be disposed to believe that the compiler has sinned in redundancy rather than deficiency in this bibliography. The evils of the former are, however, easily remedied, while those of the latter must leave the consulter in more or less doubt. Many popular works have been catalogued where original information of even slight value was contained, and when such works were among the earliest published on the regions in question. Besides those enumerated, works on California, too numerous to mention, contain incidental information (very rarely of any original value, however) respecting the fishes and fisheries of that State; and a number on the British possessions belong to the same category. Among those relative to British Columbia and Vancouver's Island worthy to be mentioned, but not to be particularized, are the volumes of Wm. Carew Hazlitt (1858), J. Desford Pemberton (1860), Duncan George Forbes Macdonald (1862), Capt. C. E. Barrett Lennard (1862), Alexander Rattray (1862), Com. R. C. Mayne (1862), G. M. Sproat (1868), Francis Poole (1872), and Capt. W. F. Butler (1873).

The titles of the Government publications are taken from a manuscript compilation embracing notices of all the reports published by the General and State governments on scientific explorations, and intended to be more particular than the present work. They are retained with the bars (|), indicating the distribution on the title-pages of the lines, etc.

Several societies have, or have had, the custom of publishing communications, sometimes of an elaborate and extended nature, without any titles. This strange and senseless mode of procedure seems to have originated in some freak or affectation of modesty on the part of authors, perhaps, rather than a deliberate intention to shirk labor or confuse matters. Confusion and trouble to others are nevertheless the result of this vicious negligence, and a consequence is an ignoring of the papers thus untitled or an irreconcilable variation of titles in different bibliographies. Whether the custom originates with authors or not, the assumption of it is discreditable to the editor or editors of the publications adopting it. A number of the papers here recorded belong to this category of the untitled or distitled: the titles fol

lowing preceded by an asterisk (*) are selected from the remarks prefatory to the paper in the proceedings, and those preceded by a dagger (†) have been composed by the present writer, since nothing intelligible precedes the papers themselves. It is to be hoped that the senseless and causeless sin in question may speedily be discontinued. There is no reason why any one should be compelled to read the whole of an article (as is sometimes necessary) to obtain an idea of what the paper relates to; and the "Catalogue of Scientific Papers (1800–1863) compiled and published by the Royal Society of London" shows how a bibliography edited under the best auspices may be involved in grave errors by the negligence adverted to.

TITLES OF WORKS.

1757—Noticia de la California, y de su conquista temporal y espiritual hasta el tiempo presente. Sacada de la historia manuscripta, formada en Mexico año de 1739. por el Padre **Miguel Venegas**, de la Compañia de Jesus; y de otras Noticias, y Relaciones antiguas, y modernas. Añadida de algunos mapas particulares, y uno general de la America Septentrional, Asia Oriental, y Mar del Sùr intermedio, formados sobre las Memorias mas recientes, y exactas, que se publican juntamente. Dedicada al Rey N.^tso^ Señor por la Provincia de Nueva-España, de la Compañia de Jesus. Tomo primero [—Tomo tercero].—Con licencia. En Madrid: En la Imprenta de la Viuda de Manuel Fernandez, y del Supremo Consejo de la Inquisicion. Año de M.D.CCLVII. [8°, 3 vols.]

[Translated as follows:—]

A Natural and Civil History of California: containing an accurate description of that country, its soil, mountains, harbours, lakes, rivers, and seas; its animals, vegetables, minerals, and famous fishery for pearls. The customs of the inhabitants, their religion, government, and manner of living, before their conversion to the Christian religion by the missionary Jesuits. Together with accounts of the several voyages and attempts made for settling California, and taking actual surveys of that country, its gulf, and coast of the South-Sea. Illustrated with copperplates, and an accurate map of the country and adjacent seas. Translated from the original Spanish of **Miguel Venegas**, a Mexican Jesuit, published at Madrid 1758.—In two volumes.—Vol. I[—II]. = London: printed for James Rivington and James Fletcher, at the Oxford Theatre, in Pater-Noster-Row. 1759. [8°, vol. i, 10 l., 455 pp., 1 pl.; vol. ii.]

[The only references to fishes are as follows (v. i, pp. 47–48):—"But if the soil of California be in general barren, the scarcity of provisions is supplied by the adjacent sea; for both in the Pacifick ocean and the Gulf of California, the multitude and variety of fishes are incredible. Father Antonio de la Ascencion, speaking of the bay of San Lucas [Lower California], says, 'With the nets which every ship carried, they caught a great quantity of fish of different kinds, and all wholesome and palatable: particularly holybuss, salmon, turbots, skates, pilchards, large oysters, thornbacks, mackerel, barbels, bonetos, soals, lobsters, and pearl oysters.' And, speaking of the bay of San Francisco, on the western coast, he adds: 'Here are such multitudes of fish, that with a net, which the commodore had on board, more was caught every day than the ship's company could make use of: and of these a great variety, as crabs, oysters, breams, mackerel, cod, barbels, thornbacks, &c.' And in other parts he makes mention of the infinite number of sardines, which are left on the sand at the ebb, and so exquisite that those of Laredo in Spain, then famous for this fish, do not exceed them. Nor are fish less plentiful along the gulf [of California], where to the above mentioned species Father Picolo adds, tunnies, anchovies, and others. Even in the rivulets of this peninsula are found barbels and crayfish: but the most distinguished fish of both seas are the whales; which induced the ancient cosmographers to call California, Punta de Balenas, or Cape Whale: and these fish being found in multitudes along both coasts, give name to a channel in the gulf, and a bay in the South sea" (v. i, pp. 47–48).]

1772—Voyage en Californie pour l'observation du passage de Vénus sur le disque du soleil, le 3 juin 1769; contenant les observations de ce phénomène et la discription historique de la route de l'auteur à travers le Mexique. Par feu M. **Chappe d'Auteroche**, . . . Rédigé et publié par M. de Cassini fils . . . À Paris: chez Charles-Antoine Jombert. MDCCLXXII. [4°, half-title, title, 170 [2] pp., plan, and 2 pl.—Sabin.]

[Translated as follows:—]

A Voyage to California, to observe the Transit of Venus. By Mons. **Chappe d'Auteroche**. With an historical description of the author's route through Mexico, and the natural history of that province. Also, a voyage to Newfoundland and Sallee, to make experiments on Mr. Le Roy's time keepers. By Monsieur de Cassini. London: printed for Edward and Charles Dilly, In The Poultry. MDCCLXXVIII. [8°, 4 p. l., 315 pp., with "plan of City of Mexico".]

Extract of a letter from Mexico addressed to the Royal Academy of Sciences at Paris, by Don **Joseph Anthony de Alzate y Ramyrez**, now a correspondent of the said academy, containing some curious particulars relative to the natural history of the country adjacent to the City of Mexico. pp. 77–105.

[It is undoubtedly this work that is meant in the statement that has so largely gone the rounds of the periodical press, to the effect that the Californian viviparous fishes were observed during the voyage for the observation of the transit of Venus to Lower California, 1769. A perusal of the accounts given, however, renders it evident that the fishes in question were not Embiotocids but rather Cyprinodontids, probably of the genus *Mollienesia*. The account by Don Alzate (pp. 89–91) is as follows:—

"I send you some viviparous scaly fishes, of which I had formerly given you an account. What I have observed in them this year is—'If you press the belly with your fingers, you force out the fry before their time, and upon inspecting them through the microscope you may discern the circulation of the blood, such as it is to be when the fish is grown up.' If you throw these little fishes into water, they will swim as well as if they had been long accustomed to live in that element. The fins and tail of the males are larger and blacker than those of the females, so that the sex is easily distinguished at first sight. These fish have a singular manner of swimming; the male and the female swim together on two parallel lines, the female always uppermost and the male undermost; they thus always keep at a constant uniform distance from each other, and preserve a perfect parallelism. The female never makes the least motion, either sideways or towards the bottom, but directly the male does the same."

To this account is added a foot-note (p. 90) containing the following additional information:—

"Don Alzate has sent those fishes preserved in spirits; their skin is covered with very small scales; they vary in length from an inch to eighteen lines, and they are seldom above five, six, or seven lines in the broadest part. They have a fin on each side near the gills, two small ones under the belly, a single one behind the anus, which lies between the fin and the single one; the tail is not forked; lastly, this fish has a long fin on the back, a little above the fin, which is under the belly.

"We know of some viviparous fishes in our seas, such as loach, &c. most of these have a smooth skin without any scales. The needle of Aristotle is viviparous, and yet covered with broad and hard scales, I have caught some that had young ones still in their womb. As to these viviparous fishes, it is a particular and new sort, and we are obliged to Don Alzate for making us acquainted with it. It breeds in a lake of fresh water near the City of Mexico."

This is, so far as known, the earliest notice of the viviparity of Cyprinodontids. The mode of consorting together (exaggerated in the account) is common to a number of representatives of the family, and is alluded to by Prof. Agassiz in a name (*Zygonectes*, *i. e.* swimming in pairs) conferred on one of the genera of the family.]

1808—Piscium Camtschaticorum [*Terpuk*] et [*Wachnja*]. Descriptiones et icones auctore [**W. G.**] **Tilesio**. D. 26 Octobri 1808. Conventui exhib. die 2 Nov. 1808. <Mém. Acad. Sci. Pétersb., v. 2, pp. 335–375, 1810, viz:—

I. Hexagrammos Stelleri, Rossis Terpuc dictus novum genus piscium Camtschaticorum. pp. 335–340, tab. 15.

II. Dimensiones piscis, beato Stellero Hexagrammos asper dicti, Rossis Teerpuk [*Terpuk*] i. e. lima (captus d. 20 Maij 1741 in portu Divi Petri et Pauli pondebat pondere medicinali duas usque ad sex uncias). pp. 340-341.

III. Hexagrammos Stelleri, quænam genera sit interponendus cuinam classi ordinique systematico sit inserendus. Labrax Pallasii (vid. ej. Monograph.). pp. 342-343.

IV. Descriptio Stelleri anno 1741 concepta. pp. 343-347

V. Observationes anatomicæ. pp. 347-349.

VI. Wachnja Camtschatica est Gadus dorso tripterygio, Callariis speciatim Lusco affinis. pp. 350-353, tab. 16, 17.

VII. Wachniæ Camtschaticæ altera species, (Gadus gracilis mihi,) quæ ab indigenis Camtschaticis acque Ůachal, Rossis Wachńja [*Wachnja*] dicitur, dimensionibus illustrata. pp. 354-356, tab. 18.

VIII. Stelleri Descriptio piscis *ονος* sive asini antiquorum. Turneri ad Gesnerum aselli 3 sivi Æglefini Rondelet et Gesneri. Æglefini Bellonii, Anglorum Hadok, Russis Wachnja [*Wachnja*] dicti corrupta voce Itaelmannica, in qua Ůakal audit. pp. 356-359.

IX. Observationes anatomicæ. pp. 360-363.

X. Observationes ex aliorum individuorum ejusdem speciei dissectionibus, pp. 363-364.

XI. Ad historiam Gadi dorso tripterygio ore cirrato caudo æquali fere cum radio primo spinoso (Kabeljau vel Cabiljau Belgarum) (Gadus morrhua L. Bloch. tab. 64), adhuc annotata sequentia. pp. 364-370.

XII. Annotationes anatomicæ. pp. 370-371.

XIII. Tabularum explicatio. pp. 372-375.

1809—Labraces, novum genus piscium, oceani orientalis, auctore **P. S. Pallas.** Conventui exhib. die 5 Julii 1809. <Mém. Acad. Sci. St. Pétersb., v. 2, pp. 382-398, 1810.

[N. sp. *L. decagrammus, L. supercilionus, L. monopterygius.*]

Description de quelques poissons observés pendant son voyage autour du monde. Par **W. G. Tilesius.** <Mém. Soc. Imp. des Naturalistes de Moscou. t. 2, pp. 212-249, with 5 pl., 1809.

1811—Iconum et Descriptionum piscium Camtschaticorum continuatio tertia tentamen monographiæ generis Agoni Blochiani sistens. Auctore [**W. G.**] **Tilesio.** Cum tabulis vi æneis.—Conventui exhibita die 11 Decembris 1811. <Mém. Acad. Sci. Pétersb., v. 4, pp. 406-478, 1813, viz:—

De novis piscium generibus, Agono Blochii et Phalangiste cel. Pallasii, propter synonymiam conjugendis. pp. 406-454.

Appendix de Cyprino rostrato et cultrato, Trachino trichodonte et Epenephelo ciliato. pp. 454-457.

Descriptio Cyprini rostrati Tungusis ad Covymam fluv. Tschukutscham et Jucagiris Onatscha dicti. pp. 457-474, tab. xv, fig. 1-5.

Epinephelus ciliatus Camtschaticus et Americanus. pp. 474-478, tab. xvi, fig. 1-6.

Zoographia Rosso-Asiatica, sistens Omnium Animalium in extenso imperio Rossico et adjacentibus maribus observatorum Recensionem, Domicilia, Mores et Descriptiones, anatomen atque Icones plurimorum. Auctore

Petro Pallas, Eq. Aur. Academico-Petropolitano.—Volumen tertium.—Petropoli in Officina Caes. Academiæ Scientiarum Impress. M.DCC.CXI. Edit. MDCCCXXXI. [4°, vii, 428, cxxv pp., 6 pl.]

[As indicated on the title-page, the "Zoographia Rosso-Asiatica" was not regularly *published* till 1831, but was printed in 1811, and was only detained by the loss of the copper-plates. The letter-press was, however, to a slight extent, distributed before the regular publication of the edition, and a copy was possessed by Cuvier, who has given a summary of the third volume in the Histoire Naturelle des Poissons (t. 1, pp. 200–201).

Describes species of which specimen had been obtained from the Russian possessions in Northwestern America. The following are published as if new, although several had previously been described:—

Phalangistes acipenserinus (p. 110, pl. 17).
Cottus polyacanthocephalus (p. 133, pl. 23).
Cottus platycephalus (p. 135, pl. 24).
Cottus trachurus (p. 138, pl. 25).
Cottus pistilliger (p. 143, pl. 20, f. 3, 4).
Blennius dolichogaster (p. 175, pl. 42, f. 2).
Blennius anguillaris (p. 176, pl. 42, f. 3).
Gadus wachna (p. 182, pl. 44).
Gadus pygmæus (p. 199).
Gadus fimbria (p. 200).
Ammodytes hexapterus (p. 226).
Ammodytes septipinnis (p. 227, pl. 48, f. 3).
Trachinus trichodon (p. 235, pl. 50, f. 1).
Trachinus cirrhosus (p. 237, pl. 50, f. 2).
Perca variabilis (p. 241).
Labrax decagrammus (p. 278, pl. 62, f. 2).
Labrax superciliosus (p. 279, pl. 63, f. 1).
Labrax monopterygius (p. 281, pl. 63, f. 4).
Labrax octogrammus (p. 283, pl. 64, f. 1).
Salmo lagocephalus (p. 372, pl. 77, f. 2).
Salmo proteus (p. 376, pl. 78, f. 2, p. 79).
Pleuronectes quadrituberculatus (p. 423).
Pleuronectes cicatricosus (p. 424).
The plates referred to were never published.

The only other species signalized as inhabitants of the American waters are the following:—
Raja batis (p. 57).
Salmo socialis (p. 389, pl. 81, f. 2).
Pleuronectes stellatus (p. 416).
Pleuronectes hippoglossus (p. 421).]

1814—History | of | the expedition | under the command of | Captains Lewis and Clark, | to | the sources of the Missouri, | thence | across the Rocky Mountains | and down the | River Columbia to the Pacific Ocean. | Performed during the years 1804–5–6. | By order of the | Government of the United States. | Prepared for the press | by **Paul Allen,** Esquire. | In two volumes. | Vol. I [—II]. | Philadelphia: | Published by Bradford and Inskeep; and | Abm. H. Inskeep, Newyork. | J. Maxwell, Printer. | 1814. [8°, vol. i, lxxviii, 470 pp., maps; vol. ii, ix, 522 pp., maps.]

[Vol. ii, chap. vii, contains "A general description of the beasts, birds, and plants, &c., found by the party in this expedition" (pp. 148–201). Incidental allusions and quasi-descriptions of a popular kind are given of some fishes, but nothing of an exact nature is made known.

"An account of the various publications relating to the travels of Lewis and Clarke, with a commentary on the zoological results of their expedition", has been published by Dr. Elliott Coues, U. S. A. (Bull. U. S. Geol. and Geog. Surv. Terr., v. 1, pp. 417–444, Feb. 8, 1876).]

1820—Relation d'un voyage à la côte du nord-ouest de l'Amérique septentrionale dans les années 1810–1814. Par **Gabriel Franchère.** [Rédigé par Michel Bibaud.] Montréal, 1820. [8°, 284 pp.—Sabin.]

[Translated as follows:—]

Narrative of a voyage to the northwest coast of America in the years 1811, 1812, 1813, and 1814, | or the first American settlement on the Pacific | By **Gabriel Franchere** | Translated and edited by J. V. Huntington | — | Redfield | 110 and 112 Nassau street, New York | 1854. [12°, 376 pp., 3 pl.]

[The salmon is noticed in chapter 18.]

1822—Voyage pittoresque autour du monde, avec des portraits de sauvages d'Amérique, d'Asie, d'Afrique, et des îles du grand océan; des paysages, des vues maritimes, et plusieurs objets d'histoire naturelle; accompagné de descriptions par M. le Baron Cuvier, et M. A. de Chamisso, et d'observations sur les crânes humains par M. le Docteur Gall. Par M. **Louis Choris**, Peintre.—Paris, de l'imprimerie de Firmin Didot, . . . 1822. [Fol., 2 p. l., vi pp.+[i], 12 pl., 17 pp.+[ii], 10 pl., 20 pp.+[iii], 14 pl., 10, 3 pp.+[iv], 18 pl., 24 pp.+[v], 19 pl., 22 pp. + [vi], 23 pl., 28 pp. + [vii], 7 pl., 19 pp.]

[Partie vi.] Chapeau de bois, sur lequel sont peintes divers animaux marins. Planche v. Par G. Cuvier. pp. 21–22.

[Cuvier considers that one of the figures (*h*) represents a *Diodon*, and such *seems* to be the case; but no species of that type has been found so far northward as Unalashka, where the hat was obtained. ("En *h*, est un *Diodon* ou orbe épineux, qui est pris à la ligne tandis que les grands cétacés du reste de ce tableau sont poursuivis avec des lances" (p. 22).]

1823—Account | of | an expedition | from | Pittsburgh to the Rocky Mountains, | performed in the years 1819 and '20, | by order of | the Hon. J. C. Calhoun, Sec'y of War: | under the command of | Major Stephen H. Long. | From the notes of Major Long, Mr. T. Say, and other gen- | tlemen of the exploring party. | — | Compiled | by **Edwin James**, | botanist and geologist for the expedition. | — | In two vols.—With an atlas. | Vol. II. | — | Philadelphia: | H. C. Carey and J. Lea, Chesnut st. | 1823. [2 v., 8°. Vol. i, 2 p. l., 503 pp.; vol. ii, 3 p. l., 442 pp.]

1828—Histoire Naturelle des Poissons, par M. le B^on^ **Cuvier**, . . . ; et par M. **Valenciennes**, ... Tome premier. À Paris, chez F. G. Levrault, . . . , 1828. [8° ed. xvi, 574 pp., 1 l.; 4° ed. xiv, 422 pp., 1 l.—pl. 1–8 (double).]

Livre premièr.—Tableau historique des progrès de l'ichthyologie, depuis son origine jusqu'à nos jours.

Livre deuxième.—Idée générale de la nature et de l'organisation des poissons.

[Pallas' "Zoographia Rosso-Asiatica" noticed at pp. 200–201.]

Histoire Naturelle des Poissons, par M. le B^on^ **Cuvier**, . . . ; et par M. **Valenciennes**, ... Tome deuxième. À Paris, chez F. G. Levrault, . . . 1828. [8° ed. xxi, (1 l.), 490 pp.; 4° ed. xvii, (1 l.), 371 pp.—pl. 9–40.]

Livre troisième.—Des poissons de la famille des Perches, ou des Percoïdes. [Par Cuvier.]

[No west-coast species specified.]

1829—Histoire Naturelle des Poissons, par M. le B^on^ **Cuvier**, . . . ; et par M. **Valenciennes**, ... Tome troisième. À Paris, chez F. G. Levrault, . . . , 1829. [8° ed. xxviii, 500 pp., 1 l.; 4° ed. xxii, (1 l.), 368 pp.—pl. 41–71.]

Livre troisième.—Des poissons de la famille des Perches, ou des Percoïdes. [Par Cuvier.]

[N. sp. name, *Trichodon Stelleri*, based on *Trachinus trichodon* Pallas.]

1829—Histoire Naturelle des Poissons, par M. le B^on^ **Cuvier**, . . . ; et par M. **Valenciennes**, ... Tome quatrième. À Paris, chez F. G. Levrault, . . . , 1829. [8° ed. xxvi, (1 l.), 518 pp.; 4° ed. xx, (1 l.), 379 pp.—pl. 72-99, 97 bis.]
Livre quatrième.—Des Acanthoptérygiens à joue cuirassée. [Par Cuvier.]
[N. sp. *Cottus ventralis*, *Hemilepidotus Tilesii*.]

Zoologischer Atlas, enthaltend Abbildungen und Beschreibungen neuer Thierarten, während des Flottcapitains von Kotzebue zweiter Reise um die Welt, auf der Russisch-Kaiserlichen Kriegsschlupp Predpriatië in den Jahren 1823-1826 beobachtet von **Dr. Friedr. Eschscholtz**, Professor und Director des zoologischen Museums an der Universität zu Dorpat, Mitglied mehrerer gelehrten Gesellschaften, Russ. Kais. Hofrathe und Ritter des Ordens des heil. Wladimir. Drittes Heft.—Berlin, 1829. Gedruckt und verlegt bei G. Reimer. [Fol., title, 18 pp., pl. 11-15.]
[N. sp. *Blepsias ventricosus* (p. 4, pl. 13), on which was subsequently based the genus *Temnistia* of Richardson.]

1830—Histoire Naturelle des Poissons, par M. le B^on^ **Cuvier**, . . . ; et par M. **Valenciennes**, ... Tome cinquième. À Paris, chez F. G. Levrault, . . . , 1830. [8° ed. xxviii, 499 pp., 2 l.; 4° ed. xx, 374 pp., 2 l.—pl. 100-140.]
Livre cinquième.—Des Sciénoïdes. [Par Cuvier.]
[No west-coast species noticed.]

Histoire Naturelle des Poissons, par M. le B^on^ **Cuvier**, . . . ; et par M. **Valenciennes**, ... Tome sixième. À Paris, chez F. G. Levrault, . . . , 1830. [8° ed. xxiv, 559 pp., 3 l.; 4° ed. xviii, (3 l.), 470 pp.—pl. 141-169, 162 bis, 162 ter, 162 quater, 167 bis, 168 bis.]
Livre sixième.—(Partie I.—Des Sparoïdes. Partie II.—Des Ménides.) [Par Cuvier et Valenciennes.]
[No west-coast species noticed.]

1831—Histoire Naturelle des Poissons, par M. le B^on^ **Cuvier**, . . . ; et par M. **Valenciennes**, ... Tome septième. À Paris, chez F. G. Levrault, . . . , 1831. [8° ed. xxix, 531 pp., 3 l.; 4° ed. xxii, (3 l.), 399 pp.—pl. 170-208.]
Livre septième.—Des Squamipennes. [Par Cuvier?]
Livre huitième.—Des poissons à pharyngiens labyrinthiformes. [Par Cuvier?]
[No west-coast species noticed.]

Histoire Naturelle des Poissons, par M. le B^on^ **Cuvier**, . . . ; et par M. **Valenciennes**, ... Tome huitième. À Paris, chez F. G. Levrault, . . . , 1831. [8° ed. xix, (2 l.), 509 pp.; 4° ed. xv, (2 l.), 375 pp.—pl. 209-245.]
Livre neuvième.—Des Scombéroïdes. [Par Cuvier et Valenciennes.]
[No west-coast species noticed.]

Zoographia Rosso-Asiatica. See 1811.

1833—Histoire Naturelle des Poissons, par M. le B^on^ **Cuvier**, . . . ; et par M. **Valenciennes**, ... Tome neuvième. À Paris, chez F. G. Levrault, . . . , 1833. [8° ed. xxix, 512 pp., 1 l.; 4° ed. xxiv, (1 l.), 379 pp.—pl. 246-279.]
Livre neuvième.—Des Scombéroïdes. [Par Cuvier et Valenciennes.]
[No west-coast species noticed.]

1835—Histoire Naturelle des Poissons, par M. le B^on^ **Cuvier**, . . . ; et par **M. Valenciennes**, ... Tome dixième. À Paris, chez F. G. Levrault, . . . , 1835. [8° ed. xxiv, 482 pp., 1 l.; 4° ed. xix, (1 l.), 358 pp.—pl. 280–306.]

Suite du livre neuvième—Des Scombéroïdes. [Par Cuvier et Valenciennes?]

Livre dixième.—De la famille des Teuthies. [Par Cuvier et Valenciennes?]

Livre onzième.—De la famille des Tænioïdes. [Par Cuvier et Valenciennes?]

Livre douzième.—Des Atherines. [Par Cuvier et Valenciennes?]

[No west-coast species noticed.]

1836—Fauna Boreali-Americana; or the Zoology of the Northern Parts of British America: containing descriptions of the objects of Natural History collected on the late northern land expeditions under command of Captain Sir John Franklin, R. N. Part third. The Fish. By **John Richardson**, M. D., F. R. S., F. L. S., Member of the Geographical Society of London, and Wernerian Natural History Society of Edinburgh; Honorary Member of the Natural History Society of Montreal, and Literary and Philosophical Society of Quebec; Foreign Member of the Geographical Society of Paris; and Corresponding member of the Academy of Natural Sciences of Philadelphia; Surgeon and Naturalist to the Expeditions.—Illustrated by numerous plates.—Published under the authority of the Right Honourable the Secretary of State for Colonial Affairs.—London: Richard Bentley, New Burlington street, MDCCCXXXVI. [4°, pp. xv, 327 (+1) pp., 24 pl. (numbered 74–97).]

[N. g. and n. sp. *Temnistia* (n. g., 59), *Cyprinus* (*Leuciscus*) *gracilis* (120), *Salmo Scouleri* (152, 223), *Salmo quinnat* (219), *Salmo Gairdneri* (221), *Salmo paucidens* (222), *Salmo taupitch* (224), *Salmo Clarkii* (225, 307), *Salmo* (*Mallotus?*) *pacificus* (226), *Acipenser transmontanus* (278), *Petromyzon tridentatus* (293); (ADDENDA:) *Cottus asper* (295, 313), *Cyprinus* (*Abramis*) *balteatus* (301), *Cyprinus* (*Leuciscus*) *caurinus* (304), *Cyprinus* (*Leuciscus*) *oregonensis* (305).]

Report on North American Zoology. By **John Richardson**, M. D., F. R. S. < Rep. 6th meeting Brit. Assoc. Adv. Sci., Aug. 1836, = v. 5, pp. 121–224, 1837.

Pisces, pp. 202–223.

Astoria, or anecdotes of an enterprise beyond the Rocky Mountains. By **Washington Irving**. [1st ed.] In two volumes. Vol. I [—II]. Philadelphia: Carey, Lea & Blanchard. 1836. [2 vols., 8°. Vol. i, 285 pp.; vol. ii, 279 pp., 1 map folded.]

[The fishes and fisheries, especially salmon, are noticed in vol. 2, chapters 9 and 14.]

Histoire Naturelle des Poissons, par M. le B^on^ **Cuvier**, ...; et par **M. Valenciennes**, ... Tome onzième. À Paris, chez F. G. Levrault, . . . , 1836. [8° ed. xx, 506 pp., 1 l.; 4° ed. xv, (1 l.), 373 pp.—pl. 307–343.]

Livre troisième.—Des Mugiloïdes.

Livre quatorzième.—De la famille des Gobioïdes.

[No west-coast species noticed.]

1837—Histoire Naturelle des Poissons, par M. le B^on^ **Cuvier**, . . .; et par **M. Valenciennes**, . . . Tome douzième. À Paris, chez F. G. Levrault, . . . , 1837. [8° ed. xxiv, 507 + 1 pp.; 4° ed. xx, 377 pp., 1 l.—pl. 344–368.]

Suite du livre quatorzième.—Gobioïdes.

Livre quinzième.—Des Acanthoptérygiens à pectorales pédiculées.

1839—Histoire Naturelle des Poissons, par M. le B^on^ **Cuvier**, . . .; et par **M. Valenciennes**, . . . Tome troisième. À Paris, chez Pitois-Levrault et C^e^, . . . , 1839. [8° ed. xix, 505 pp., 1 l.; 4° ed. xvii, 370 pp.—pl. 369–388.]

Livre seizième—Labroïdes.

[No west-coast species noticed.]

1839—Histoire Naturelle des Poissons, par M. le Bon **Cuvier**, . . .; et par M. **Valenciennes**, . . . Tome quatorzième. À Paris, chez Pitois-Levrault et Ce, . . . , 1839. [8° ed. xxii, 464 pp., 3 l.; 4° ed. xx, 344 pp., 3 l.—pl. 389-420.]

Suite du livre seizième.—Labroïdes.

Livre dix-septième.—Des Malacoptérygiens. Des Siluroïdes.

[No west-coast species noticed]

The Zoology of Captain Beechey's Voyage; compiled from the collections and notes made by Captain Beechey, the officers and naturalist of the Expedition, during a Voyage to the Pacific and Behring's straits performed in his Majesty's Ship Blossom, under the command of Captain F. W. Beechey, R. N., F. R. S., &c., &c. in the years 1825, 26, 27, and 28. By J. Richardson, M. D., F. R. S., &c.; N. A. Vigors, Esq., A. M., F. R. S., &c.; G. T. Lay, Esq.; E. T. Bennett, Esq., F. L. S., &c.; the Rev. W. Buckland, D. D., F. R. S., F. L. S., F. G. S., &c. and G. B. Sowerby, Esq.—Illustrated with upwards of fifty finely coloured plates, by Sowerby.—Published under the authority of the Lords Commissioners of the Admiralty. = London: Henry G. Bohn, 4, York Street, Covent Garden.—MDCCCXXXIX.

Fishes; by **G. T. Lay**, Esq., and **E. T. Bennett**, Esq., F. L. S., &c. pp. 41-75, pl. 15-23.

[N. sp. *Chimæra colliei* (p. 71, pl. 23).

This volume is interesting as being the first publication in which any attempt has been made to scientifically indicate the fishes of the coast. The "naturalist" of the expedition was, however, incompetent for the task, and the notes taken evince that he was not sufficiently versed in the rudiments of ichthyology to know what to observe. Nevertheless, the notes have an interest, if not of importance, enough to transcribe what relates to the regions in question:—

"Off Saint Lawrence Island was caught, in the dredge a fish apparently allied to the genus *Liparis*, Art. It had the 'ventral fins placed before the pectorals, but united and continuous with them; a flat, raised, and rough tubercle, of nearly the diameter of an English sixpence, was seated forward between the pectorals, its anterior part reaching as far as the ventrals; this may be of use in copulation: its *cæca* were pretty numerous.'—C. The roughness of this tubercle renders it difficult to refer the fish to any known species; but it is probably nearly related to the *Cyclopterus gelatinosus*, Pall., a *Liparis* which is known to inhabit the seas in which this was obtained. The existence of *cæca* removes it from *Lepadogaster*, Gouan.

"Kotzebue Sound afforded a specimen of a new species of *Ophidium*, L., the *Oph. stigma*.

"On the coast of California, a little to the northwards of the harbour of San Francisco, an *Orthagoriscus* was met with, apparently the *Orth. mola.*, Bl. They swam about the ship with the dorsal fin frequently elevated above the surface." (p. 50.)

"On the coast of California, at Monterey, Mr. Collie's notes mention the occurrence of [1] a species of *Sparus*, of two *Scombri*, and of a *Clupea*. [2] The first of the *Scombridæ* is apparently a *Scomber*, Cuv.; it was 'smaller than the mackerel; it was marked on the back with cross waved narrow bands of black and greenish blue; its first dorsal fin had nine spines, and there were four small pinnules behind the second dorsal and the anal: it had a simple air-bladder of moderate size, and an immense number of *cæca*, with a stomach extending the whole length of the abdomen, narrow, tapering to the posterior part, and covered throughout nearly its whole length with the milt.? Its internal membrane forms longitudinal folds; the intestines have three convolutions.'—C. This fish occurred in shoals. [3] The second species was met with but once. It is a *Caranx*, Cuv., of which 'the teeth in the upper maxillary are scarcely to be felt: the pectorals reach nearly to opposite the *anus:* a double narrow stripe of deeper blue than the general surface runs backwards on each side of the first dorsal fin to opposite its termination, the two parts being separated by a broad line of dirty white, which has a narrow, dark-coloured line along its middle: there are no distinct divisions in the anal and second dorsal fins: the air-bladder is simple, and small, and extends from the *fauces* to the *anus;* the stomach is much shorter than in the preceding species; the *cæca*, although numerous, are less so than in it, and the intestine is folded in the same manner.'—C. From the nature of the colouring of this fish, as described by Mr. Collie, there can be little doubt of its constituting a distinct species.

[4] Along with the first species of *Scomber*, there occurred in shoals a small species of *Clupea*, L., 'without teeth; with the dorsal fin a little before the ventral; and with the back dark greenish blue, and having one line and part of another of rounded black spots on each side nearly on a level with the eye: the gill membranes contain six rays, and overlap each other at their lower part; the stomach resembles that of the first *Scomber*; it has also numerous *cæca*; the air-bladder is small and tapering.'—C. The other fishes observed at Monterey were [5] a new species of *Chimæra*, Cuv., differing essentially from the *Chimæra* of the Atlantic, and approaching somewhat in the position of its second dorsal fin to the *Callorhynchus*, Cuv.; [6] a species of *Torpedo*, Dum.; and [7] a *Raia*" (pp. 54–55).]

1839—Narrative of a Journey across the Rocky Mountains, to the Columbia River, and a Visit to the Sandwich Islands, Chili, &c. With a Scientific Appendix. By **John K. Townsend**, Member of the Academy of Natural Sciences of Philadelphia. Philadelphia: Henry Perkins, 134 Chestnut street. Boston: Perkins & Marvin.—1839. [8°, 352 pp.]

[A few incidental popular notices of salmon and trout are given.]

[Reprinted in England under the following title:—]

Sporting Excursions in the Rocky Mountains, including a Journey to the Columbia River, and a Visit to the Sandwich Islands, Chili, &c. By **J. K. Towshend** [*sic!*], Esq. In two volumes. Vol. I [—II]. London: Henry Colburn, Publisher, Great Marlborough Street. 1840. [8°. Vol. i, xii [+i], 312 pp., 1 pl.; vol. ii, xii, 310 pp., 1 pl.]

[In vol. i, chap. 7, are given details respecting salmon and the mode of catching them, and the frontispiece illustrates a native woman "spearing the salmon".]

1840—Histoire Naturelle des Poissons, par M. le Bon **Cuvier**, . . .; et par M. **Valenciennes**, . . . Tome quinzième. À Paris, chez Ch. Pitois, éditeur, . . . , 1840. [8° ed. xxxi, 540 pp., 1 l.; 4° ed. xxiv, 397 pp.—pl. 421–455.]

Suite du livre dix-septième.—Siluroïdes.

[No west-coast species noticed.]

Narrative of a whaling voyage round the globe, from the year 1833 to 1836, comprising sketches of Polynesia, California, the Indian Archipelago, etc. with an account of Southern Whales, the Sperm Whale Fishery, and the Natural History of the climates visited. By **Frederick Debell Bennett**, Esq., F. R. G. S., Fellow of the Royal College of Surgeons, London. In two volumes. Vol. I [—II]. London: Richard Bentley, New Burlington street, publisher in ordinary to her Majesty.—1840. [8°, vol. i, xv, 402 pp., 1 pl., 1 map; vol. ii, vii, 396 pp., 1 pl.]

1842—Histoire Naturelle des Poissons, par M. le Bon **Cuvier**, . . . , et par M. **Valenciennes**, ... Tome seizième. À Paris, chez P. Bertrand, . . . , 1842. [8° ed. xx, 472 pp, 1 l.; 4° ed. xviii, 363 pp., 1 l.—pl. 456–487.]

Livre dix-huitième.—Cyprinoïdes.

Zoology of New-York, or the New-York Fauna; comprising detailed descriptions of all the animals hitherto observed within the State of New-York, with brief notices of those occasionally found near its borders, and accompanied by appropriate illustrations.—By **James E. DeKay**.—Part IV.—Fishes. Albany: Printed by W. & A. White and I. Visscher. 1842. [4°, xiv [1, errata], 415 pp.; atlas, 1 p. l., 79 pl.]

[The letterpress of the Reptiles and Fishes, each separately paged, forms one volume, and the plates, each separately numbered, another. Eight of the northwest-coast Malacopterygian species (*Abramis balteatus*, *Leuciscus caurinus*, *Leuciscus oregonensis*, *Salmo quinnat*, *Salmo Gairdnerii*, *Salmo Scouleri*, *Salmo truppitch*, and *Salmo nitidus*) and the Sturgeon (*Acipenser transmontanus*) enumerated by Richardson (1836) are briefly indicated as "extra-limital".]

1844—Histoire Naturelle des Poissons, par M. le Bon **Cuvier**, . . . ; et par M. **Valenciennes**, ... Tome dix-septième. À Paris, chez P. Bertrand, . . . , 1844. [8° ed. xxiii, 497 pp., 1 l.; 4° ed. xx, 370 pp. 1 l.—pl. 487 (bis)–519.]

Suite du livre dix-huitième.—Cyprinoïdes.

1845—Description of a new species of *Syngnathus*, brought from the western coast of California by Capt. Phelps. By Dr. **D. H. Storer**. <Proc. Boston Soc. Nat. Hist., v. 2, p. 73, December, 1845.

[N. sp. *Syngnathus californiensis*.]

1846—A Synopsis of the Fishes of North America. By **David Humphreys Storer**, M. D., A. A. S., ... <Mem. Am. Acad. Arts and Sci., new series, vol. ii, pp. 253–550, Cambridge, 1846.

[739 nominal species from all North America, including the West Indies, are described. The descriptions, however, are most inaptly compiled and entirely insufficient.]

A Synopsis of the Fishes of North America. By **David Humphreys Storer**, M. D., A. A. S., ... Cambridge: Metcalf and Company, Printers to the University. 1846. [4°, 1 p. l. (=title), 298 pp.]

[A reprint, with separate pagination, title-page, and index, of the preceding.

According to Dr. Storer (Mem. Acad., p. 260; Syn. p. 8), "the following species inhabit the northwestern coast of America:—

Trichodon stelleri.
Cottus pistilliger.
Cottus polyacanthocephalus.
Cottus asper.
Aspidophorus acipenserinus.
Hemilepidotus Tilesii.
Blepsias trilobus.
Sebastes variabilis.
Cyprinus balteatus.
Leuciscus caurinus.
Leuciscus oregonensis.
Salmo salar.
Salmo quinnat.
Salmo Gairdnerii.
Salmo pauxidens.
Salmo Scouleri.
Salmo tsuppitch.
Salmo nitidus.
Mallotus pacificus.
Cyclopterus ventricosus.
Acipenser transmontanus."]

Histoire Naturelle des Poissons, par M. le Bon **Cuvier**, . . . ; et par M. **Valenciennes**, ... Tome dix-huitième. À Paris, chez P. Bertrand, . . . , 1846. [8° ed. xix, 505 pp., 2 l.; 4° ed. xviii, 375 pp., 2 l.—pl. 520–553.]

Suite du livre dix-huitième.—Cyprinoïdes.

Livre dix-neuvième.—Des Esoces ou Lucioïdes.

Histoire Naturelle des Poissons, par M. le Bon **Cuvier**, . . . ; et par M. **Valenciennes**, ... Tome dix-neuvième. À Paris, chez P. Bertrand, . . . , 1846. [8° ed. xix, 544 pp., 3 l.; 4° ed. xv, 391 pp., 2 l.—pl. 554–590.]

Suite du livre dix-neuvième.—Brochets ou Lucioïdes.

Livre vingtième.—De quelques familles* de Malacoptérygiens, intermédiaires entre les Brochets et les Clupes.

[No west-coast species described.]

Histoire Naturelle des Poissons, par M. le Bon **Cuvier**, . . . ; et par M. **Valenciennes**, ... Tome vingtième. À Paris, chez P. Bertrand, . . . ; 1846. [8° ed. xviii, 472 pp., 1 l.; 4° ed. xiv, 346 pp. 1 l.—pl. 591–606.]

Livre vingt et unième.—De la famille des Clupéoïdes.

1848—Historia Fisica y Politica de Chile segun documentos adquiridos en esta república durante doce años de residencia en ella y publicada bajo los auspicios del Supremo Gobierno. Por **Claudio Gay**, ciudadano Chileno, indi-

* The families referred to are:—Chirocentres (with the genus *Chirocentrus*); Alepocéphales (with *Alepocephalus*); Lutodeires (with *Chanos* and *Gonorhynchus*); Mormyres (with *Mormyrus*); Hyodontes (with *Osteoglossum*, *Ichnosoma*, and *Hyodon*); Butirins (with *Albula*=*Butirinus*); Élopiens (with *Elops* and *Megalops*); Amies (with *Amia*); Vastres ou Amies? (*Vastres*); famille particulière, ou Amies? (*Heterotis*); Erythroïdes (with *Erythrinus*, *Macrodon*, *Lebiasina*, and *Pyrrhulina*); and Ombres (with *Umbra*).

vidno de varias sociedades cientificas nacionales y etrangeras. Zoologia. Tomo segundo. Paris, en casa del autor. Chile, en el Museo de Historia Natural de Santiago. MDCCCXLVIII. [Text, 8°; atlas, fol.]

[Pesces, pp. 137–370 and index.—In this work are described several species afterward discovered along the coast of California.]

1848—Thirtieth Congress—first session. | = | Ex. Doc. No. 41. | — | Notes of a military reconnoissance, | from | Fort Leavenworth, in Missouri, | to | San Diego, in California, | including part of the | Arkansas, Del Norte, and Gila Rivers. | — | By Lieut. Col. **W. H. Emory.** | Made in 1846–7, with the advanced guard of the "Army of the West." | — | February 9, 1848.—Ordered to be printed. | February 17, 1848.—*Ordered*, That 10,000 extra copies of each of the Reports of Lieu- | tenant Emory, Captain Cooke, and Lieutenant Abert, be printed for the use of the House; | and that of said number, 250 copies be furnished for the use of Lieutenant Emory, Captain | Cooke, and Lieutenant Abert, respectively. | Washington: | Wendell and Van Benthuysen, printers. | : : : : | 1848. [8°, 614 pp., 50 lith. pl. not numbered, 14 numbered, 2 sketch-maps, and 3 maps folded.]

[This work has been so badly edited that the following analysis may prove useful, and will facilitate the understanding of the work:—]

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Notes concerning the minerals and fossils, collected by Lieutenant J. W. Abert, while engaged in the geographical examination of New Mexico, by J. W. Bailey, professor of chemistry, mineralogy, and geology, at the United States Military Academy. pp. 547–548, 2 lith. pls.

Report of Lieut. Col. P. St. George Cooke | of | his march from | Santa Fé, New Mexico, | to | San Diego, Upper California. pp. 549–563, 2 maps folded.

Journal | of | Captain A. R. Johnston, | First Dragoons. pp. 565–614.

[A species of *Gila* is noticed at p. 62, and illustrated by a poor plate opposite the text. It is said:—"We heard the fish playing in the water, and soon those who were disengaged were after them. At first it was supposed they were the mountain trout, but, being comparatively fresh from the hills of Maine, I soon saw the difference."]

Histoire Naturelle des Poissons, par M. le B^on^ **Cuvier**, . . . ; et par M. **Valenciennes**, . . . Tome vingt et unième. À Paris, chez P. Bertrand, . . . , 1848. [8° ed. xiv, 536 pp.; 4° ed. xiii (+ iii), 391 pp.— pl. 607–633.]

* Pages 289–304 misnumbered 209–224.

Suite du livre vingt et unième et des Clupéoïdes.*
Livre vingt-deuxième.—De la famille des Salmonoïdes.
[No west-coast species described.]

1849—Frank Forrester's Fish and Fishing of the United States and British Provinces of North America. Illustrated from nature by the author. By **Henry William Herbert**, author of "Field Sports," "Warwick Woodlands," etc. New York, Stringer & Townsend, 222 Broadway, 1849. 8°.

Histoire Naturelle des Poissons, par M. le B^on **Cuvier**, . . . ; et par M. **Valenciennes**, . . . Tome vingt-deuxième. À Paris, chez P. Bertraud, . . . , 1849. [8° ed. xx, 532, (index) 91 (+ 1) pp.; 4° ed. xvi, 395, (index) 81 (+ 1) pp.—pl. 634–650.]

Suite du livre vingt-deuxième.—Suite de la famille des Salmonoïdes.

[No west-coast species described.]

A Monograph of the Fresh water Cottus of North America. By **Charles Girard**. Aug. 1849. < Proc. Am. Assoc. Adv. Sci., v. 2, pp. 409–411, 1850.

On the genus Cottus Auct. By **Charles Girard**. Oct. 17, 1849. < Proc. Bost. Soc. Nat. Hist., v. 3, pp. 183–190, 1849.

1850—Some additional observations on the nomenclature and classification of the genus Cottus. By **Charles Girard**. June 19, 1850. < Proc. Bost. Soc. Nat. Hist., v. 3, pp. 302–305, 1850.

1851—On a new genus of American Cottoids. By **Charles Girard**. Feb. 5, 1851. < Proc. Bost. Soc. Nat. Hist., v. 4, pp. 18–19, 1851.

Révision du genre Cottus des auteurs. Par **Charles Girard**, de l'Association américaine pour l'avancement des sciences, membre de la Société d'histoire naturelle de Boston. [1851. 4°, 28 pp.] < N. Denkschr. allg. Schweizer. Gesell. gesammt. Naturw., B. 12, 1852.

Smithsonian Contributions to Knowledge. = Contributions to the Natural History of the Fresh Water Fishes of North America. By **Charles Girard**. I. A Monograph of the Cottoids. Accepted for publication by the Smithsonian Institution, December, 1850. [Smithsonian Contributions to Knowledge,] vol. iii, art. 3. [4°, 80 pp., 3 pl.]

Description of a new form of Lamprey from Australia, with a Synopsis of the Family. By **J. E. Gray**, Esq., F. R. S., V. P. Z. S., etc. < Proc. Zool. Soc. London, part xix, pp. 235–241, plates, Pisces, iv, v, 1851.

List of the specimens of Fish in the collection of the British Museum.—Part I.—Chondropterygii.—Printed by order of the trustees. London, 1851. [12°, x, [1], 160 pp., 2 pl.]

[The name of the compiler is not published on the title-page. In the usual introduction, Mr. Gray states:—"The characters of the genera of Sharks and Rays, with their synonyms, have principally been derived from the work of Professors Müller and Henle. The specimens which were not named by those authors when engaged in their work, or by Dr. Andrew Smith, have been determined by Mr. Edward Gerrard." The responsibility of the compilation, however, apparently devolves on JOHN EDWARD GRAY. The diagnoses of the groups, and, for the most part, the synonymy of the species, are, in fact, translated or transcribed from Müller and Henle's great work on the Plagiostomes, entitled, as follows:—Systematische Beschreibung der Plagiostomen von Dr. J. MÜLLER, o. ö. Professor der Anatomie und Physiologie, und Director des anatomischen Theaters und Museums in Berlin, und Dr. J. HENLE, o. ö. Professor der Anatomie und Director des anatomischen Theaters und Museums in Zürich. Mit sechzig Steindrucktafeln. Berlin, Verlag von Veit und Comp.—1841. [Folio, xxii, 200 pp., 2 l., 60 pl., mostly colored, unnumbered.] An epoch-making work, but with no notices of Western American species.]

* The Notoptères are differentiated from the Clupeoïdes as a very distinct family (une famille très-distincte).

1851—Supplement to Frank Forrester's Fish and Fishing of the United States and British Provinces of North America. By **William Henry Herbert**, author of the "Field Sports of North America," "Frank Forrester and his Friends," etc. New York, Stringer & Townsend, 222 Broadway, 1851. pp. 1–86.

1853—Descriptions of some new Fishes from the River Zuñi. By **S. F. Baird** and **Charles Girard**. June 28, 1853. <Proc. Acad. Nat. Sci., vol. 6, pp. 368–369, June, 1853.

[N. g. and sp. *Gila* (n. g. 368), *Gila robusta* (369), *Gila elegans* (369), *Gila gracilis* (369).]

Descriptions of New Species of Fishes collected by Mr. John H. Clark, on the U. S. and Mexican Boundary Survey, under Lt. Col. Jas. D. Graham. By **Spencer F. Baird** and **Charles Girard**. August 30, 1853. <Proc. Acad. Nat. Sci. Phila., v. 6, pp. 387–390, August, 1853.

[N. sp. *Catostomus latipinnis* (388), *Gila Emoryi* (388), *Gila Grahami* (389), *Cyprinodon macularius* (389), *Heterendria affinis* (390), *Heterendria occidentalis* (390).]

32d Congress, | 2d session. { Senate. } Executive | No. 59. | — | Report of an Expedition | down the | Zuñi and Colorado Rivers, | by | Captain **L. Sitgreaves**, | Corps Topographical Engineers. | — | Accompanied by maps, sketches, views, and illustrations. | — | Washington: | Robert Armstrong, public printer. | 1853. [8°, 190 pp., 1 l., 24 pl. of scenery (pl. 1 folded), 6 pl. of mammals, 6 pl. of birds, 2 pl. of reptiles, 3 pl. of fishes, 21 pl. of botany, 1 folded map, all at end.]

Title. p. 1.

Report of the Secretary of War, communicating, [etc.] p. 3.

[Sitgreaves's report.] pp. 4–29.

Report | on | the natural history | of the | country passed over by the exploring expedition | under the command of Brevet Captain L. Sitgreaves, | U. S. Topographical Engineers, during the year 1851. | By **S. W. Woodhouse**, M. D., | surgeon and naturalist to the expedition. | pp. 31–40.

Zoology. | — | Mammals and Birds, by S. W. Woodhouse, M. D. | Reptiles, by Edward Hallowell, M. D. | Fishes, by Prof. **S. F. Baird** and **Charles Girard**. | pp. 41–152.

Mammals. By S. W. Woodhouse, M. D. pp. 43–57, 6 pl. (1–6).

Birds. By S. W. Woodhouse, M. D. pp. 58–105, 6 pl. (1–6).

Reptiles. By Edward Hallowell, M. D. pp. 106–147, 21 pl. (1–20+ 10 *a*).

Fishes. By **Spencer F. Baird** and **Charles Girard**. pp. 148–152, 3 pl. (1–3).

Botany. | — | By Professor John Torrey. pp. 153–178, 21 pls. (1–21).

Medical Report. | — | By S. W. Woodhouse, M. D. pp. 179–185.

List of illustrations. pp. 187–190.

Table of contents. [1 l.]

Extraordinary Fishes from California, constituting a new family, described by **L. Agassiz**. <Am. Journ. Sci. and Arts, (2), v. 16, pp. 380–390, Nov. 1853; also reprinted in Edinburgh New Phil. Journ., v. 57, pp. 214–227; translated in Archiv für Naturgeschichte (Berlin), Jahrg. 20, B. 1, pp. 149–162, 1853.

[Family named "Family Holconoti or Embiotocoidæ" (p. 383). N. g. and n. sp. *Embiotoca* (n. g., 388):—1. *Embiotoca Jacksoni* (387); 2. *Embiotoca Caryi* (389).]

[This article was translated into German as follows:—]

Ueber eine neue Familie von Fischen aus Californien. Von **L. Agassiz**. Aus Silliman's Amer. Journ. vol. xvi. p. 380 übersetzt. Vom Herausgeber [F. H. Troschel]. <Archiv für Naturgeschichte, 20. Jahrg., B. 1, pp. 140–162, 1854.

[This translation was followed by the following original communication, in which the systematic relations of the family were definitely determined:—]

Ueber die systematische Stellung der Gattung Embiotoca. Bemerkung zur vorigen Abhandlung. Vom Herausgeber [Dr. **F. H. Troschel**]. <Archiv für Naturgeschichte, 20. Jahrg., B. 1, pp. 163–168, 1854.

1854—The Zoology of the Voyage of H. M. S. Herald, under the command of Captain Henry Kellett, R. N., C. B., during the years 1845–51.—Published under the Authority of the Lords Commissioners of the Admiralty.—Edited by Professor Edward Forbes, F. R. S. Vertebrals, including Fossil Mammals. By Sir **John Richardson**, Knt., C. B., M. D., F. R. S.—London: Lovell Reeve, 5, Henrietta street, Covent Garden.—1854. [4°, xi, vi, [1], 171 [+ 1] pp., 32 pl.]

Fish. pp. 156–171, and pl. xxviii, pl. xxxiii.

[Describes *Platessa stellata*, mouth of Coppermine River (164, pl. 32, f. 1–3); *Platessa glacialis*, Bathurst's Inlet (166, pl. 32); *Salmo confluentus*, Yukon River (167, pl. 32); *Salmo dermatinus*, Yukon River (169, pl. 33, f. 3–5).]

Notice of a collection of Fishes from the southern bend of the Tennessee River, in the State of Alabama. By **L. Agassiz**. <Am. Journ. Sci. and Arts, (2), v. 17, pp. 297–308, Mar. 1854; v. 17, pp. 353–369, May, 1854.

Appendix.—Additional notes on the Holconoti. pp. 365–369, May, 1854.

[N. g. and n. sp. *Embiotoca lateralis* (366). *Rhacochilus* (n. g.) *toxotes* (367), *Amphistichus* (n. g.) *argenteus* (367), *Holconotus* (n. g., 367) *rhodoterus* (368).]

[Translated as follows:—]

Nachträgliche Bemerkungen über die Holconoti. Von Prof. **L. Agassiz**. Aus Silliman Amer. Journ. xvii. p. 365. Uebersetzt vom Herausgeber [J. H. Troschel]. <Archiv für Naturgeschichte, 21. Jahrg., B. 1, pp. 30–34, 1855.

Description of four new species of Viviparous Fishes from Sacramento River and the Bay of San Francisco. Read before the California Academy of Natural Sciences, May 15, 1854. By **W. P. Gibbons**, M. D. June 27, 1854. <Proc. Acad. Nat. Sci. Phila., v. 7, pp. 105–106, 1854.

[N. sp. *Hysterocarpus Traskii* (105), *Hyperprosopon argenteum* (105) and var. *a. punctatum* (106), *Cymatogaster aggregatus* (106), *Cymatogaster minimus* (106).]

Description of new Species of Viviparous Marine and Fresh-water Fishes, from the Bay of San Francisco, and from the River and Lagoons of the Sacramento. By **W. P. Gibbons**, M. D. [Read before the California Academy of Natural Sciences, Jan. 9th and May 15th, 22d, and 29th, 1854.] July 25, 1854. <Proc. Acad. Nat. Sci. Phila., v. 7, pp. 122–126, July, 1854.

[N. g. and n. sp. *Holconotus* (122), *H. Agassizii* (122), *H. Gibbonsii*, "Cal. Acad. of N. S." (122), *H. fuliginosus* (123), *Cymatogaster* (n. g.), *C. Larkinsii* (123), *C. pulchellus* (123), *C. ellipticus* (124), *Hysterocarpus* (n. g.), *H. Traskii* (124), *Hyperprosopon* (n. g.), *H. argenteus* (125), *H. arcuatus* (125), *Micrometrus* (n. g.), *M. aggregatus* (125), *M. minimus* (125), *Mytilophagus* (n. g.), *M. fasciatus* (125), *Pachylabrus* (n. g.), *P. variegatus* (126).]

[Translated as follows:—]

Beschreibung neuer Fische aus der Familie Holconoti aus dem Busen von San Francisco, aus dem Sacramento-Fluss und dessen Lagunen. Von **W. P. Gibbons**. Aus den Proceedings of the Acad. of nat. sc. of Philadelphia vol. vii. 1854. p. 122. übersetzt vom Herausgeber [F. H. Troschel]. <Archiv für Naturgeschichte, 21. Jahrg., B. 1, pp. 331–341, 1855.

Descriptions of new Fishes, collected by Dr. A. L. Heermann, Naturalist attached to the survey of the Pacific Railroad Route, under Lieut. R. S. Williamson, U. S. A. By **Charles Girard**. Aug. 29, 1854. <Proc. Acad. Nat. Sci. Phila., v. 7, pp. 129–140, 1854.

[N. g. and n. sp.:—1. *Centrarchus interruptus* (129), 2. *Cottopsis gulosus* (129), 3. *Aspicottus* (n. g.) *bison* (130), 4. *Leptocottus* (n. g., 130) *armatus* (131), 5. *Scorpaenichthys* (n. g.) *marmoratus* (131), 6. *Sebastes auriculatus* (131), 7. *Chirus pictus* (132), 8. *Chirus guttatus* (132), 9.

Ophiodon (n. g.) *elongatus* (133), 10. *Gasterosteus Williamsoni* (133), 11. *Gasterosteus microcephalus* (133), 12. *Atherinopsis* (n. g.) *californiensis* (134), 13. *Gobius gracilis* (134), 14. *Embiotoca lineata* (134), 15. *Amphistichus similis* (135), 16. *Amphistichus Heermanni* (135), 17. *Gila crassicephala* (135), 18. *Pogonichthys inæquilobus* (136), 19. *Pogonichthys symmetricus* (136), 20. *Lavinia* (n. g.) *exilicauda* (137), 21. *Lavinia crassicauda* (137), 22. *Lavinia conformis* (137), 23. *Leuciscus occidentalis* (137), 24. *Clupea mirabilis* (138), 25. *Meletta cærulea* (138), 26. *Engraulis mordax* (138), 27. *Platichthys* (n. g.) *rugosus* (139), 28. *Pleuronichthys* (n. g.) *cœnosus* (139), 29. *Parophrys* (n. g., 139) *vetulus* (140), 30. *Psettichthys* (n. g.) *melanostictus* (140).]

1854—Enumeration of the species of marine Fishes, collected at San Francisco, California, by Dr. C. B. R. Kennerly, naturalist attached to the survey of the Pacific R. R. Route, under Lieut. A. W. Whipple. By **Charles Girard.** Aug. 29, 1854. < Proc. Acad. Nat. Sci. Phila., v. 7, pp. 141–142, Aug. 1854.

[N. g. and n. sp.:—1. *Chirus constellatus* (141), 3. *Porichthys* (n. g.) *notatus* (141), 8. *Gadus proximus* (141), 10. *Psettichthys sordidus* (142).]

Observations upon a collection of Fishes made on the Pacific coast of the U. States, by Lieut. W. P. Trowbridge, U. S. A., for the Museum of the Smithsonian Institution. By **Charles Girard.** Aug. 29, 1854. < Proc. Acad. Nat. Sci. Phila., v. 7, pp. 142–156, 1854.

[N. g. and n. sp.:—1. *Labrax nebulifer* (142), 2. *Labrax clathratus* (143), 3. *Heterostichus* (n. g.) *rostratus* (143), 4. *Sphyræna argentea* (144), 5. *Cottopsis parvus* (144), 8. *Scorpænichthys lateralis* (145), 9. *Scorpæna guttata* (145), 11. *Sebastes rosaceus* (146), 12. *Sebastes fasciatus* (146), 15. *Gasterosteus plebeius* (147), 16. *Gasterosteus inopinatus* (147), 17. *Umbrina undulata* (148), 18. *Glyphisodon rubicundus* (148), 19. *Belone exilis* (149), 20. *Blennius gentilis* (149), 21. *Gunnellus ornatus* (149), 22. *Apodichthys* (n. g.) *flavidus* (150), 23. *Apodichthys violaceus* (150), 24. *Anarrhichas felis* (150), 26. *Julis modestus* (151), 29. *Embiotoca lineata* (151), 30. *Embiotoca Caseidyi* (151), 32. *Holconotus Trowbridgii* (152), 33. *Holconotus megalops* (152), 31. *Phanerodon* (n. g.) *furcatus* (153), 36. *Pogonichthys argyreiosus* (153), 37. *Fundulus parvipinnis* (154), 42. *Engraulis delicatissimus* (154), 43. *Argentina pretiosa* (150), 44. *Pleuronectes maculosus* (155), 48. *Lepadogaster reticulatus* (155), 49. *Syngnathus brevirostris* (156), 50. *Syngnathus leptorhynchus* (156).]

†Descriptions of two species of fish, believed to be new. Sept. 4, 1854. By **Wm. O. Ayres.** < Proc. Cal. Acad. Sci., v. 1, pp. 3–4, 1854; 2d ed., pp. 3–4, 1873.

[N. sp. *Labrus pulcher*, *Hemitripterus marmoratus*.]

†Descriptions of two new species of Sebastes. Sept. 11, 1854. By **Wm. O. Ayres.** < Proc. Cal. Acad. Sci., v. 1, pp. 5–6, 1854; 2d ed., pp. 5–6, 1873.

[N. sp. *S. nebulosus*, *S. paucispinis*.]

†Descriptions of new species of fish. Sept. 18, 1854. By **Wm. O. Ayres,** M. D. < Proc. Cal. Acad. Sci., v. 1, pp. 7–8, 1854; 2d ed., pp. 7–8, 1873.

[N. sp. *Sebastes ruber*, *Sebastes ruber* var. *parvus*, *Sebastes variabilis*, *Centrarchus maculosus*.]

†Observations on the development of Anableps Gronovii, a viviparous fish from Surinam. By Prof. **Jeffries Wyman.** Sept. 20, 1854. < Proc. Boston Soc. Nat. Hist., v. 5, pp. 80–81, Dec. 1854.*

*Remarks in relation to the Mode of Development of Embiotocoidæ. By **Charles Girard.** Sept. 20, 1854. < Proc. Boston Soc. Nat. Hist., v. 5, pp. 81–82, Dec. 1854.

*Two new fishes, Morrhua californica and Grystes lineatus. By **Wm. O. Ayres.** Oct. 2, 1854. < Proc. Cal. Acad. Sci., v. 1, pp. 9–10, 1854; 2d ed., pp. 8–10, 1873.

[N. sp. *Morrhua californica*, *Grystes lineatus*.]

*See, *also*, Observations on the development of Anableps Gronovii (Cuv. and Val.). By Jeffries Wyman, M. D. Read Sept. 20, 1854. < Boston Journ. Nat. Hist., v. 6, pp. 432–443, pl. 17, Nov. 1854.

1854—† Descriptions of a new species of cottoid fish, and remarks on the American Acanthocotti. By **Wm. O. Ayres**, M. D. Oct. 9, 1854. < Proc. Cal. Acad. Sci., v. 1, p. 11, 1854; 2d ed., p. 11, 1873.

[N. sp. *Clypeocottus robustus* (= *Aspicottus bison* Grd.).]

† Descriptions of two new species of fish. By **Wm. O. Ayres**, M. D. Oct. 23, 1854. < Proc. Cal. Acad. Sci., v. 1, pp. 13–14, 1854; 2d. ed., pp. 12–13, 1873.

[N. sp. *Brosmius marginatus*, *Syngnathus griseolineatus*.]

New species of Californian Fishes, by **William O. Ayres**, M. D. Nov. 1, 1854. < Proc. Boston Soc. Nat. Hist., v. 5, pp. 94–103, Dec. 1854, and Feb. 1855.

[N. sp. *Sebastes pascispinis* (94), *Sebastes nebulosus* (96), *Sebastes ruber* (97), *Sebastes ruber* var. *parvus* (98), *Centrarchus maculosus* (99), *Morrhua californica* (100), *Labrus pulcher* (101).]

* Descriptions of the Sturgeons [Acipenser] found in our [Californian] waters. By **Wm. O. Ayres**, M. D. Nov. 27, 1854. < Proc. Cal. Acad. Sci., v. 1, p. 15, Dec. 1854; 2d ed., pp. 14–15 1873.

[N. sp. *A. acutirostris*, *A. medirostris*, *A. brachyrhynchus*.]

Characteristics of some Cartilaginous Fishes of the Pacific coast of North America. By **Charles Girard**. Nov. 28, 1854. < Proc. Acad. Nat. Sci. Phila., v. 7, pp. 196–197, 1854.

[N. sp.:—1. *Cestracion francisci* (196), 2. *Triakis semifasciatum* (196), 3. *Spinax* (*Acanthias*) *Suckleyi* (196), 5. *Raja binoculata* (196).]

Abstract of a Report to Lieut. Jas. M. Gilliss, U. S. N., upon the Fishes collected during the U. S. N. Astronomical Expedition to Chili. By **Charles Girard**. Nov. 28, 1854. < Proc. Acad. Nat. Sci. Phila., v. 7, pp. 197–199, 1854.

[Genus *Atherinopsis* noticed, and the *Meletta cærulea* of Aug. 29, 1854, v. 7, p. 138, redescribed as a new species, under the name *Alosa musica*.]

† Descriptions of two new species of fish. By **Wm. O. Ayres**, M. D. Dec. 4, 1854. < Proc. Cal. Acad. Sci., v. 1, pp. 17–18, 1854; 2d ed., pp. 16–17, 1873.

[N. sp. *Osmerus elongatus*, *Mustelus felis*.]

† Descriptions of two new species of Cyprinoids. By **Wm. O. Ayres**, M. D. Dec. 11, 1854. < Proc. Cal. Acad. Sci., v. 1, pp. 18–19, 1854; 2d ed., pp. 17–18, 1873.

[N. sp. *Catostomus occidentalis*, *Gila grandis*.]

* Descriptions of two new Cyprinoid fish. By **Wm. O. Ayres**, M. D. Dec. 18, 1854. < Proc. Cal. Acad. Sci., v. 1, pp. 20–21, 1854; 2d ed., pp. 19–20, 1873.

[N. sp. *Lavinia gibbosa*, *L. compressa*.]

* Description of a new Cyprinoid fish. By **Wm. O. Ayres**, M. D. Dec. 25, 1854. < Proc. Cal. Acad. Sci., v. 1, pp. 21–22, 1854; 2d ed., pp. 20–21, 1873.

[N. sp. *Gila microlepidota*.]

A list of the Fishes collected in California, by Mr. E. Samuels, with descriptions of the new species. By **Charles Girard**, M. D. [1854.] < Boston Journ. Nat. Hist., v. 6, pp. 533–544, pl. 24–26, 1857.

1855—Synopsis of the Ichthyological Fauna of the Pacific Slope of North America, chiefly from the collections made by the U. S. Exp. Exped. under the command of Capt. C. Wilkes, with recent additions and comparisons with eastern types. By **Louis Agassiz**. < Am. Journ. Sci. and Arts, v. 19, pp. 71–99, Jan., 1855; v. 19, pp. 215–231, March, 1855.

[N. g. and n. sp. *Catostomus occidentalis* (94), *Acrocheilus* (n. g., 96) *alutaceus* (99), *Ptychocheilus* (n. g., 227), *Ptychocheilus gracilis* (229), *Ptychocheilus major* (229), *Mylocheilus* (n. g. 229) *lateralis* 231).]

1855—*On two species of Liparis. By **Wm. O. Ayres**, M. D. Jan. 8, 1855. <Proc Cal. Acad. Sci., v. 1, pp. 23-24, Feb. 1, 1855; 2d ed., pp. 21-23, 1873.
[N. sp. *L. pulchellus*, *L. mucosus*.]

†Description of a new genus (Leptogunellus) and two new species of fishes. By **Wm. O. Ayres**, M. D. Jan. 22, 1855. <Proc. Cal. Acad. Sci., v. 1, pp. 25-27, 1855; 2d ed., pp. 24-25, 1873.
[N. sp. *Leiostomus lineatus*, *Leptogunellus gracilis*.]

†Description of a Lamprey, from the vicinity of San Francisco. By **Wm. O. Ayres**, M. D. Feb. 5, 1855. <Proc. Cal. Acad. Sci., v. 1, p. 28, Feb. 19, 1855; 2d ed., p. 27, 1873.
[N. sp. *Petromyzon plumbeus*.]

*Remarks on the fœtal Zygæna (Hammer-headed Shark). By **Jeffries Wyman**. Feb. 21, 1855. <Proc. Boston Soc. Nat. Hist., v. 5, p. 157, March, 1855.

†Description of a new generic type among fishes. By **Wm. O. Ayres**, M. D. Feb. 26, 1855. <Proc. Cal. Acad. Sci., v. 1, pp. 31-32, 1855; 2d ed., pp. 30-31, 1873.
[N. sp. *Anarrhichthys ocellatus*.]

†Description of a new species of Catastomus. By **Wm. O. Ayres**, M. D. March 5, 1855. <Proc. Cal. Acad. Sci., v. 1, pp. 32-33, 1855; 2d ed., pp. 31-32, 1873.
[N. sp. *Catostomus labiatus*.]

*Description of a new ichthyic type. By **Wm. O. Ayres**, M. D. March 12, 1855. <Proc. Cal. Acad. Sci., v. 1, pp. 33-35, 1855; 2d ed., pp. 32-34, 1873.
[N. g. and n. sp. *Mylopharodon* (n. g.) *robustus*.]

*Description of a new Trout. By **W. P. Gibbons**. March 19, 1855. <Proc. Cal. Acad. Sci., v. 1, pp. 36-37, 1855; 2d ed., pp. 35-36, 1873.
[N. sp. *Salmo irideus*.]

*On specimens of Gasterosteus plebeius, Gir., brought from San José by the Rev. Mr. Douglas. By **Wm. O. Ayres**, M. D. April 2, 1855. <Proc. Cal. Acad. Sci., v. 1, p. 40, 1855; 2d ed., p. 39, 1873.

†Description of a new Platessa, and remarks on the Flatfish of the San Francisco markets. By **Wm. O. Ayres**, M. D. April 2, 1855. <Proc. Cal. Acad. Sci., v. 1, pp. 39-40, 1855; 2d ed., pp. 39-40, 1873.
[N. sp. *Platessa bilineata*.]

†Description of a new Salmo and a new Petromyzon. By **Wm. O. Ayres**. April 16, 1855. <Proc. Cal. Acad. Sci., v. 1, pp. 43-45, 1855; 2d ed., pp. 42-44, 1873.
[N. sp. *Salmo rivularis*, *Petromyzon ciliatus*.]

Notice upon the Viviparous Fishes inhabiting the Pacific coast of North America, with an enumeration of the species observed. By **Charles Girard**. April 24, 1855. <Proc. Acad. Nat. Sci. Phila., v. 7, pp. 318-323, 1855.
[N. g. and n. sp.:—3. *Embiotoca Webbi* (320), 5 *Embiotoca ornata* (321), 6. *Embiotoca perspicabilis* (321), 7. *Damalichthys* (n. g.) *vacca* (321), 9. *Abeona* (n. g.) *Trowbridgii* (322), 11. *Ennichthys* (n. g., 322), *Ennichthys megalops* (323), 12. *Ennichthys Heermanni* (323).]

[Translated into German by Dr. Troschel as follows:—]

Ueber die lebendig gebärenden Fische an der Westküste von Nordamerika. Von **Charles Girard**. (Proceedings of the Academy of nat. sc. of Philadelphia April 1855.) Uebersetzt vom Herausgeber [Prof. Dr. Troschel]. <Archiv für Naturgeschichte, 21. Jahrg, B. 1, pp. 342-354 [numb. 344], 1855.

1855—† Description of a Gasterosteus believed to be new, and on the American species of the genus. By **Wm. O. Ayres.** April 30, 1855. < Proc. Cal. Acad. Sci., v. 1, pp. 47–48, 1855; 2d ed., pp. 46–47, 1873.

[N. sp. *Gasterosteus serratus*; name *Gasterosteus dekayi* proposed for *Gasterosteus biaculeatus* DeKay.]

† Description of a new species of Apodichthys. By **William O. Ayres, M. D.** May 21, 1855. < Proc. Cal. Acad. Sci., v. 1, pp. 55–56, 1855; 2d ed., pp. 54–55, 1873.

[N. sp. *Apodichthys virescens.*]

† Description of a new generic type of Blennoids. By **William O. Ayres, M. D** June 4, 1855. < Proc. Cal. Acad. Sci., v. 1, pp. 58–59, 1855; 2d ed., pp. 58–59, 1873.

[N. sp. *Cebedichthys cristagalli.*]

† Description of a new Carangoid fish. By **William O. Ayres, M. D.** July 2, 1855. < Proc. Cal. Acad. Sci., v. 1, pp. 62–63, 1855; 2d ed., p. 64, 1873.

[N. sp. *Caranx symmetricus.*]

† Description of a new species of Whiting. By **William O. Ayres, M. D.** July 16, 1855. < Proc. Cal. Acad. Sci., v. 1, p. 64, 1855; 2d ed., pp. 65–66, 1873.

[N. sp. *Merlangus productus.*]

* Description of a fish, representing a type entirely new to our waters. By **Wm. O. Ayres, M. D.** Aug. 6, 1855. < Proc. Cal. Acad. Sci., v. 1, pp. 66–67, 1855; 2d ed., p. 69, 1873.

[N. sp. *Saurus lucioceps.*]

* Description of a new species of Cramp fish. By **William O. Ayres, M. D.** Sept. 10, 1855. < Proc. Cal. Acad. Sci., v. 1, pp. 70–71, 1855; 2d ed., pp. 74–75, 1873.

[N. sp. *Torpedo californica.*]

† On a viviparous fish from Japan. By **Louis Agassiz.** Sept. 11, 1855. < Proc. Am. Acad. Arts and Sci., v. 3, p. 204, 1855.

"A Flying Fish, *Exocœtus fasciatus* Le Sueur, from the Pacific Ocean, lat. 30° 06′ N., long. 113° 02′ W. [Gulf of California], presented by Dr. **Lanszweert.**" Sept. 24, 1855. < Proc. Cal. Acad. Sci., v. 1, pp. 71–73, 1855.

† Description of a Shark of new generic type. By **Wm. O. Ayres, M. D.** Oct. 8, 1855. < Proc. Cal. Acad. Sci., v. 1, pp. 72–73, 1855; 2d ed., pp. 76–77, 1873.

[N. sp. *Notorhynchus maculatus.*]

* Remarks concerning a collection of fishes made by Lieut. W. P. Trowbridge at or near Cape Flattery, W. T. By **Wm. O. Ayres, M. D.** Oct. 22, 1855. < Proc. Cal. Acad. Sci., v. 1, p. 74, 1855; 2d ed., p. 79, 1873.

[10 species enumerated.]

† On a supposed new genus of Cottoids. By **Wm. O. Ayres, M. D.** Dec. 24, 1855. < Proc. Cal. Acad. Sci., v. 1, pp. 75–77, 1855; 2d ed., pp. 81–82, 1873.

[N. sp. *Calycilepidotus spinosus*, *Scorpænichthys lateralis* Grd. = *Calycilepidotus lateralis.*

1856—Contributions to the Ichthyology of the Western Coast of the United States, from specimens in the Museum of Smithsonian Institution. By **Charles Girard, M. D.** June 24, 1856. < Proc. Acad. Nat. Sci. Phila., v. 8, pp. 131–137, 1855.

[N. g. and n. sp. *Paralabrax* (n. g., 131), *Homalopomus* (n. g.) *Trowbridgii* (132), *Oligocottus* (n. g., 132) *maculosus* (133), *Leiocottus* (n. g.) *hirundo* (133), *Artedius* (n. g., 134). *Artedius notospilotus* (134), *Sebastes melanops* (135), *Oplopoma* (n. g.) *pantherina* (135), *Gasterosteus intermedius* (135), *Gasterosteus pugetti* (135), *Gobius Newberryi* (136), *Embiotoca argyrosoma* (136), *Coregonus Williamsoni* (136), *Platichthys umbrosus* (136), *Pleuronichthys guttulatus* (137), *Ammodytes personatus* (137), *Rhinoptera vespertil o* (137).]

Researches upon the Cyprinoids inhabiting the fresh water Fishes of the United States of America, west of the Mississippi Valley, from specimens in the Museum of the Smithsonian Institution. By **Charles Girard**, M. D. Sept. 30, 1856. < Proc. Acad. Nat. Sci. Phila., v. 8, pp. 165–213, 1856.

[N. g. and n. sp. *Mylocheilus fratercul us* (169), *Catostomus* (*Acomus*, n. s. g.) *gencrosus* (174), *Catostomus macrocheilus* (175), *Catostomus bernardini* (175), *Algansea* (n. g.), *Algansea bicolor* (183), *Algansea obesa* (183), *Algansea formosa* (183), *Lavinia harengus* (184), *Argyreus nubilus* (186), *Argyreus osculus* (186), *Argyreus notabilis* (186), *Agosia* (n. g.), *Agosia chrysogaster* (187), *Agosia metallica* (187), *Meda* (n. g.) *fulgida* (192), *Richardsonius* (n. g.) *lateralis* (202), *Tiaroga* (n. g.) *cobitis* (204), *Tigoma* (n. g.), *Tigoma bicolor* (206), *Tigoma purpurea* (206), *Tigoma intermedia* (206), *Tigoma obesa* (206), *Tigoma Humboldti* (206), *Tigoma lineata* (206), *Tigoma gracilis* (206), *Tigoma nigrescens* (207), *Tigoma crassa* (207), *Cheonda* (n. g.), *Cheonda Cooperi* (207), *Cheonda cærulea* (207), *Siboma* (n. g.) *atraria* (208), *Ptychocheilus rapax* (209), *Ptychocheilus lucius* (209), *Ptychocheilus vorax* (209).]

Notice upon the Species of the Genus Salmo of authors, observed chiefly in Oregon and California. By **Charles Girard, M. D.** Oct. 28, 1856. < Proc. Acad. Nat. Sci. Phila., v. 8, pp. 217–220, 1856.

[N. sp. *Salmo spectabilis* (218), *Fario aurora* (218), *Fario argyreus* (218), *Fario stellatus* (219), *Salar Lewisi* (219), *Salar virginalis* (220).]

33d Congress, | 2d Session. } House of Representatives. { Ex. Doc. | No. 97. | = | Narrative | of | the Expedition of an American Squadron | to | the China Seas and Japan, | performed in the years 1852, 1853 and 1854, | under the command of | Commodore M. C. Perry, United States Navy, | by | order of the Government of the United States. | — | Volume II. With illustrations. | — | Washington: | A. O. P. Nicholson, printer. | 1856. [4°, 4 p. l., 414 pp.; [Treaty,] 2 p. l., 14 pp.; [Index,] iii–xi pp., 1 l.]

Notes on some figures of Japanese Fish, taken from recent specimens by the artists of the U. S. Japan Expedition. By **James Carson Brevoort.** (pp. 253–256, pl. iii–xii.)

[Contains notice of *Ditrema* and first notice of the recognition of the affinity between the Embiotocoids of California and the Japanese genus.]

33d Congress, 2d Session. } Senate. { Ex. Doc. No. 78. | = | Reports | of | Explorations and Surveys, | to | ascertain the most practicable and economical route for a railroad | from the | Mississippi River to the Pacific Ocean | made under the direction of the Secretary of War, | in 1853–4, | according to acts of Congress of March 3, 1853, May 31, 1854, and August 5, 1854. | — | Volume V. | — | Washington: | Beverley Tucker, Printer. | 1856.

Explorations and Surveys for a railroad route from the Mississippi River to the Pacific Ocean. | War Department. | = | Routes in California, to connect with the routes near the thirty-fifth and thirty-second | parallels, explored by Lieut. R. S. Williamson, Corps Topographical Engineers, in 1853. | — | Geological report, | by | William P. Blake, | Geologist and Mineralogist of the Expedition. | [With appendix.] | — | Washington, D. C. | 1857. =

Appendix.—Article I. Notice of the fossil fishes.—By Professor **Louis Agassiz.**—(pp. 313–316, and 1 plate ("Fossils plate 1").)

1856—33d Congress, | 2d Session. } Senate. { Ex. Doc. | No. 78. = Reports | of | Explorations and Surveys, | to | ascertain the most practicable and economical route for a railroad | from the | Mississippi River to the Pacific Ocean | made under the direction of the Secretary of War, in | 1853-4, | according to acts of Congress of March 3, 1853, May 31, 1854, and August 5, 1854. | -- | Volume IV. | — | Washington: | Beverley Tucker, Printer. | 1856.

Explorations and surveys for a railroad route from the Mississippi River to the Pacific Ocean. | War Department. | = | Route near the thirty-fifth parallel, explored by Lieut. A. W. Whipple, Topographical | Engineers, in 1853 and 1854. | — | Report on the zoology of the expedition. | — | Washington, D. C. | 1856. = [17 pp., 1 l.]

No. 1.—Field notes and explanations.—By **C. B. R. Kennerly**, M. D., Physician and Naturalist to the Expedition.—pp. 5-17.

1857—The Northwest Coast; or, Three Years' Residence in Washington Territory. By **James G. Swan.** [Figure of terr. seal.] With numerous illustrations. New York: Harper & Brothers, Publishers, Franklin Square. 1857. [12°, 435 pp. (incl. 26 figs. and pl.), frontispiece, 1 map.]

[Popular notices of fishes—especially salmon and fishing for salmon—are given in chapters 3, 7, 9, and 14.]

* Account of some observations on the development of Anableps Gronovii, as compared with that of the Embiotocas of California. By **Jeffries Wyman.** Nov. 18, 1857. < Proc. Boston S c. Nat. Hist., v. 6, p. 294, Jan. 1858.

Notice upon new Genera and new Species of Marine and Fresh-water Fishes from Western North America. By **Charles Girard**, M. D. Nov. 24, 1857. < Proc. Acad. Nat. Sci. Phila., v. 9, pp. 200-202, Nov. 1857.

[N. g. and n. sp. *Chiropsis* (n. g., 201), *Oligocottus analis* (201), *Oligocottus globiceps* (201), *Zaniolepis* (n. g.) *latipinnis* (202), *Blepsias oculofasciatus* (202).]

33d Congress, | 2d Session. } Senate. { Ex. Doc. | No. 78. | = | Reports | of | Explorations and Surveys, | to | ascertain the most practicable and economical route for a railroad | from the | Mississippi River to the Pacific Ocean. | Made under the direction of the Secretary of War, in | 1854-5, | according to Acts of Congress of March 3, 1853, May 31, 1854, and August 5, 1854. | — | Volume VI. | — | Washington: | Beverley Tucker, Printer. | 1857.

Explorations and Surveys for a Railroad Route from the Mississippi River to the Pacific Ocean. | War Department. | = | Routes in California and Oregon explored by Lieut. R. S. Williamson, Corps of Topographical | Engineers, and Lieut. Henry L. Abbot, Corps of Topographical Engineers, in 1855. | — | Zoological Report.— | Washington, D. C. | 1857. | =

No. 1. Report upon Fishes collected on the Survey.—By **Charles Girard**, M. D.—pp. 9-34, with plates xxii *a*, xxii *b*, xxv *a*, xxv *b*, xl *a*, xlvi, lxii, lxvi, lxviii, lxx, lxxiv.

Report on the fauna and medical topography of Washington Territory. By **Geo. Suckley**, M. D. May, 1857. < Trans. Am. Med. Assoc., v. 10, pp. 181-217, 1857.

[Fishes noticed at pp. 202-203.]

1858—Description of several new species of Salmonidæ from the north-west coast of America. By **George Suckley**, M. D. Read December 6, 1858. < Ann. Lyc. Nat. Hist. New York, v. 7, pp. 1-10, 1862.

[N. sp. *Salmo Gibbsii* (1), *Salmo truncatus* (3), *Salmo gibber* (6), *Salmo confluentus* (8), *Salmo canis* (9).]

Ichthyological Notices, by **Chas. Girard**, M. D. Dec. 28, 1858. < Proc. Acad. Nat. Sci. Phila., vol. 10, pp. 223-225, Dec. 1858.

[§ 1-4, n. sp. "*Fario Newberrii*, or else *Salmo Newberrii*" (225).]

1858—Denkwürdigkeiten einer Reise nach dem russischen Amerika, nach Mikronesien and durch Kamtschatka. Von **F. H. v. Kittlitz.**—Erster Band [—Zweiter Band].—Gotha. Verlag von Justus Perthes. 1858. [8°, vol. i, xvi, 383 pp., 2 pl.; vol. ii, 2 p. l., 463 pp., 2 pl.]

1859—33d Congress, | 2d Session. } Senate. { Ex. Doc. | No. 78. | = | Reports | of | Explorations and Surveys, | to | ascertain the most practicable and economical route for a railroad | from the | Mississippi River to the Pacific Ocean. | Made under the direction of the Secretary of War, in | 1853–6, | according to Acts of Congress of March 3, 1853, May 31, 1854, and August 5, 1854. | — | Volume X. | — | Washington: | Beverley Tucker, Printer. | 1859.

Explorations and Surveys for a railroad route from the Mississippi River to the Pacific Ocean. | War Department. | = | Fishes: by **Charles Girard, M. D.** | — | Washington, D. C. | 1858.* = [xiv, 400 pp., with plates vii–viii, xiii-xiv, xvii, xviii, xxii c, xxvi, xxix, xxx, xxxiv, xxxvii, xl, xli, xlviii, liii, lix, lxi, lxiv, lxv, lxxi.]

[N. g. and n. sp. *Oligocottus globiceps* (58), *Nautichthys* (n. g., 74), *Amblodon saturnus* (98), *Polamys lineolata* (106), *Trachurus boops* (108), *Ephippus zonatus* (110), *Neoclinus* (n. g., 114), *Neoclinus Blanchardi* (114), *Xiphidion* (n. g., 119), *Xiphidion mucosum* (119), *Ophidion Taylori* (138), *Paralichthys* (n. g., 146), *Tigoma egregia* (291), *Thalcichthys* (n. g., 325), *Thalcichthys Stevensii* (325), *Engraulis mordax* (335), *Engraulis compressus* (336), *Tetraodon politus* (340), *Hippocampus ingens* (342), *Syngnathus Abboti* (346), *Syngnathus arundinaceus* (346), *Raja Cooperi* (372), *Petromyzon lividus* (379), *Petromyzon astori* (380), *Ammocœtes cibarius* (383).†

As this report brings up our knowledge of the fish fauna of the Pacific coast slope of the United States to the time of its publication, and marks a epoch in the ichthyography of the region in question, the species described are hereinbelow enumerated. Of the several columns, (1) the first contains the family name, (2) the second the generic, (3) the third the specific, and (4) the right hand one, the page where the species are described:—

Order I.—ACANTHOPTERI.

Percidæ	Ambloplites	interruptus	10
	Paralabrax	nebulifer	33
		clathratus	34
Trachinidæ	Heterostichus	rostratus	36
Sphyrænidæ	Sphyræna	argentea	39
Heterolepididæ	Chiropsis	constellatus	42
		pictus	43
		guttatus	44
		nebulosus	45
	Oplopoma	pantherina	46
	Ophiodon	elongatus	48
Cottidæ	Cottopsis	asper	51
		gulosus	53
		parvus	54
	Oligocottus	maculosus	56
		analis	57
		globiceps	58
	Leptocottus	armatus	60
	Leiocottus	hirundo	62
	Scorpænichthys	marmoratus	64
	Aspicottus	bison	66
	Hemilepidotus	spinosus	68
	Artedius	lateralis	70

* General Report upon the Zoology of the several Pacific Railroad Routes. Part IV.

† *Dionda grisea* (230), "from twenty miles west of Choctaw agency", is the only other new species described.

Order I.—ACANTHOPTERI—Continued.

Cottidæ	Artedius	notospilotus	71
	Zaniolepis	latipinnis	73
	Nautichthys	oculo-fasciatus	75
Scorpænidæ	Scorpæna	guttata	77
	Sebastes	rosaceus	78
		fasciatus	79
		auriculatus	80
		melanops	81
		paucispinis	83
Gasterosteidæ	Gasterosteus	plebeius	86
		serratus	88
		intermedius	89
		inopinatus	90
		microcephalus	91
		pugetti	92
		Williamsonii	93
Sciænidæ	Amblodon	saturnus	98
	Leiostomus	lineatus	99
	Umbrina	undulata	101
Atherinidæ	Atherinopsis	californiensis	103
Scombridæ	Scomber	diego	105
	Pelamys	lineolata	106
	Trachurus	symmetricus	107
		boops	108
Squamipennes	Ephippus	zonatus	110
Blennidæ	Blennius	gentilis	113
	Neoclinus	Blanchardi	114
	Gunnellus	ornatus	116
	Apodichthys	flavidus	117
		virescens	118
	Xiphidion	mucosus	119
	Cebidichthys	violaceus	121
	Lumpenus	anguillaris	123
	Anarrhichthys	felis	125
Gobidæ	Gobius	lepidus	127
		Newberri	128
Cyclopteridæ	Lepadogaster	meandricus	130
	Cyclogaster	pulchellus	132
Batrachidæ	Porichthys	notatus	134
	Order II.—ANACANTHINI.		
	Suborder I.—APODES.		
Ophididæ	Ophidion	Taylori	138
	Ammodytes	personatus	139
	Suborder II.—THORACICI.		
Gadidæ	Brosmius	marginatus	141
	Merlangus	productus	141
	Morrhua	proxima	142
	Homalopomus	Trowbridgii	144
Pleuronectidæ	Platessa	bilineata	146
	Paralichthys	maculosus	147
	Platichthys	rugosus	148
		umbrosus	149
	Pleuronichthys	cœnosus	151
		guttulatus	152
	Pacophrys	vetulus	153
	Psettichthys	melanostictus	154
		sordidus	155

Order III.—PHARYNGOGNATHI.

Suborder I.—MALACOPTERYGII.

Scomberesocidæ	Belone	exilis	158

Suborder II.—ACANTHOPTERYGII.

Pomacentridæ	Glyphisodon	rubicundus	161
Labridæ	Labrus	pulcher	162
	Julis	modestus	167
Embiotocoidæ	Embiotoca	Jacksoni	169
		Cassidii	171
		Webbi	173
		lineata	174
		ornata	176
		perspicabilis	178
		argyrosoma	180
	Damalichthys	vacca	182
	Phanerodon	furcatus	184
	Abeona	Trowbridgii	186
	Rhacochilus	toxotes	188
	Hysterocarpus	Traskii	190
	Holconotus	rhodoterus	193
	Ennicthys	megalops	197
		Heermanni	199
	Amphistichus	argenteus	201
		similis	203

Order IV.—PHYSOSTOMI *or* MALACOPTERI.

Suborder II.—ABDOMINALES.

Cyprinidæ	*Tribe of Cyprini.*		
	Mylocheilus	caurinus	213
		lateralis	214
		fraterculus	215
	Mylopharodon	conocephalus	216
		robustus	216
	Tribe of Catostomi.		
	Acomus	generosus	221
	Catostomus	occidentalis	224
		labiatus	224
		macrocheilus	225
	Tribe of Chondrostomi.		
	Orthodon	microlepidotus	237
	Algansea	bicolor	238
		obesa	239
		formosa	239
	Lavinia	exilicauda	241
		harengus	242
	Tribe of Pogonichthi.		
	Argyreus	dulcis	243
		nubilus	244
	Pogonichthys	inæquilobus	245
		symmetricus	246
		argyreiosus	246
		communis	247

Order IV.—PHYSOSTOMI *or* MALACOPTERI—Continued.

Cyprinidæ	*Tribe of Alburni.*		
	Cyprinella	Gunnisoni	267
		lugubris	271
		ludibunda	271
	Richardsonius	balteatus	278
		lateralis	279
	Luxilus	occidentalis	280
	Gila	robusta	285
		elegans	286
		gracilis	287
	Tigoma	conformis	289
		bicolor	289
		obesa	290
		humboldti	291
		egregia	291
		lineata	292
		gracilis	293
		crassa	293
	Chiouda	Cooperi	294
		cærulea	295
	Siboma	crassicauda	296
		atraria	297
	Ptychocheilus	oregonensis	298
		grandis	299
		rapax	300
		vorax	301
Cyprinodontidæ	Fundulus	parvipinnis	303
Salmonidæ	Salmo	Scouleri	305
		quinnat	306
		spectabilis	307
	Fario	aurora	308
		tauppitch	310
		argyreus	312
		Gairdneri	313
		Clarkii	314
		stellatus	316
	Salar	virginalis	320
		iridea	321
	Osmerus	pretiosus	324
	Thaleichthys	Stevensi	325
	Coregonus	Williamsoni	326
Scopelidæ	Laurus (Laurida)	luciocops	328
Clupeidæ	Clupea	mirabilis	329
	Meletta	cærulea	330
	Engraulis	mordax	334
		nanus	335
		delicatissimus	335
		compressus	335
	Order V.—PLECTOGNATHI.		
Balistidæ	Balistes	——	338
Gymnodontidæ	Tetraodon	politus	340
	Order VI.—LOPHOBRANCHII.		
Hippocampidæ	Hippocampus	ingens	342
Syngnathidæ	Syngnathus	californiensis	344
		brevirostris	345
		leptorhynchus	345
		Abboti	346
		arundinaceus	346

	Order VII.—GANOIDEI.		
Sturionidæ	Acipenser	brachyrhynchus	355
		transmontanus	355
		acutirostris	355
		medirostris	356
	Order VIII.—HOLOCEPHALI.		
Chimæridæ	Chimæra	Colliei	360
	Order IX.—PLAGIOSTOMI.		
	Suborder I.—SQUALI.		
Scylliodontidæ	Triakis	semifasciatus	362
Mustelidæ	Mustelus	felis	364
Cestraciontidæ	Cestracion	francisci	365
Notidanidæ	Heptanchus	maculatus	367
Spinacidæ	Acanthias	Sucklii	368
	Suborder II.—RAJÆ.		
Rhinobatidæ	Rhinobatus	productus	370
Torpedinidæ	Narcine	californica	371
Rajidæ	Raja	cooperi	372
	Uraptera	binoculata	373
Myliobatidæ	Rhinoptera	vespertilio	375
	Order X.—DERMOPTERI.		
	Suborder MARSIPOBRANCHII s. CYCLOSTOMI.		
Petromyzontidæ	Petromyzon	tridentatus	377
		ciliatus	378
		lividus	379
		plumbeus	380
		astori	380
	Ammocœtes	cibarius	383

Explorations and Surveys for a Railroad route from the Mississippi River to the Pacific Ocean. | War Department. | = | Route near the 38th and 39th parallels, explored by Captain J. W. Gunnison, and near the 41st | parallel, explored by Lieutenant E. G. Beckwith. | — | Zoological Report.[1] | — | Washington, D. C. | 1857. | = | [1] The report to which the present article belongs will be found in Vol. II of the series.

No. 4. Report on Fishes collected on the Survey.—By **Charles Girard**, M. D.—(pp. 21-27, with pl. xxiii, xlix, liv, lvi, lxxiii, lxxv.)

Explorations and surveys for a railroad route from the Mississippi River to the Pacific Ocean. | War Department. | = | Route near the thirty-fifth parallel, explored by Lieutenant A. W. Whipple, Topographical | Engineers, in 1853 and 1854. | — | Zoological Report. | — | Washington, D. C. | 1859. | =

No. 5. Report upon Fishes collected on the Survey.—By **C. Girard**, M. D.—pp. (47-59, with pl. iii-vi, ix, x, xxi, xxiv, xxv, xxxv, xl *b*, lii, lvii, lviii.)

Explorations and Surveys for a Railroad Route from the Mississippi River to the Pacific Ocean. | War Department. | = | Routes in California, to connect with the routes near the thirty-fifth and thirty-second | parallels, explored by Lieut. R. S. Williamson, Corps of Top. Eng., in 1853. | — | Zoological Report. | — | Washington, D. C. | 1859. =

No. 4. Report on Fishes collected on the Survey.—By **Charles Girard**, M. D.—(pp. 83-91, with pl. ii, xii, xxii, xxvii, xxviii, xxxi, xxxvi, xxxviii, xxxix, xlvii.)

1859—On some unusual modes of gestation in Batrachians and Fishes. By **Jeffries Wyman.** < Am. Journ. Sci. and Arts, (2), v. 27, pp. 5–13, Jan., 1859; reprinted < Can. Nat., v. 5, pp. 42–49, 1860; Zoologist, v. 18, pp. 7173–7179, 1860.

Ichthyological Notices. By **Charles Girard,** M. D. < Proc. Acad. Nat. Sci. Phila., 1859.

§ 5–27, Feb. 22, 1859, v. 10, pp. 56–58, 1859.
§ 28–40, March 29, 1859, v. 10, pp. 100–104, 1859.
§ 41–59, April 26, 1859, v. 10, pp. 113–122, 1859.
§ 60–77, May 31, 1859, v. 10, pp. 157–161, 1859.

[N. sp. *Neoclinus satiricus* (§ 5, p. 56), *Myrichthys tigrinus* (§ 6, p. 58).]

† On new fishes of the Californian coast. By **Wm O. Ayres,** M. D. Oct. 17, 1859. < Proc. Cal. Acad. Sci., v. 2, pp. 25–32, 1859.

[N. sp. *Sebastes nigrocinctus, Sebastes helvomaculatus, Sebastes elongatus, Anoplopoma* (n. g.) *merlangus, Stereolepis* (n. g.) *gigas, Squatina californica, Hippoglossus californicus, Muræna mordax, Orthagoriscus analis, Julis semicinctus.*]

Catalogue of the Fishes in the British Museum. By **Albert Günther,** . . . . Volume first. London: printed by order of the trustees. 1859. [August.]

At first only entitled:—Catalogue of the Acanthopterygian Fishes in the collection of the British Museum. By Dr. **Albert Günther.** Volume first. Gasterosteidæ, Berycidæ, Percidæ, Aphredoderidæ, Pristipomatidæ, Mullidæ, Sparidæ. London: printed by order of the Trustees. 1859. [General title + xxxix, 524 pp.—10*s.*]

1860—Salmon Fishery on the Sacramento River. By **C. A. Kirkpatrick.** < Hutchings's California Magazine, v. 4, pp. 529–534, June, 1860.

† Notes on Fishes previously described in the Proceedings, with figures of seven. By **Wm. O. Ayres,** M. D. July 2, 1860. < Proc. Cal. Acad. Sci., v. 2, pp. 52–59, 1860.

[N. g. *Halias* for *Brosmius marginatus.*]

Beiträge zur Kenntniss der Gobioiden. Von **Franz Steindachner.** (Mit 1 Tafel.) < Sitzungsb. mathem.-naturw. Classe [K. Akad. Wissensch.] vom 12. Juli 1860, xlii. Band, No. 23, Sitzung vom 18. October 1860, pp. 283–292.

* Description of new fishes. By **Wm. O. Ayres,** M. D. Aug. 6, 1860. < Proc. Cal. Acad. Sci., v. 2, pp. 60–64, 1860.

[N. sp. *Trichodon lineatus, Osmerus thaleichthys,* with figures.]

Catalogue of the Fishes in the British Museum. By **Albert Günther,** . . . . Volume second. London: printed by order of the trustees. 1860. [Sept.]

At first only entitled:—Catalogue of the Acanthopterygian Fishes in the collection of the British Museum. By Dr. **Albert Günther,** . . . . Volume second. Squamipinnes, Cirrhitidæ, Triglidæ, Trachinidæ, Sciænidæ, Polynemidæ, Sphyrænidæ, Trichiuridæ, Scombridæ, Carangidæ, Xiphiidæ. London: printed by order of the Trustees. 1860. [General title + xxi, 548 pp. —8*s.* 6*d.*]

[Nov. loc. *Naucrates ductor* (374), *Echeneis remosa* (378), *Echeneis naucrates* (384). N. sp. *Cottus criniger* (522), *Aspidophoroides inermis* (524).]

Reports of Explorations and Surveys to ascertain the most practicable and economical route for a Railroad from the Mississippi River to the Pacific Ocean, made under the direction of the Secretary of War, in 1853-6, &c. Vol. X. Washington, 1859. Fishes; by Charles Girard, M. D. Washington, D. C., 1858. [Review, by **Theodore Gill.**] < Am. Journ. Sci. and Arts, 2d series, vol. 30, pp. 277–281, Sept. 1860.

1860—36th Congress, 1st Session. } Senate. { Ex. Doc. | = | Reports | of | Explorations and Surveys | to | ascertain the most practicable and economical route for a railroad | from | the | Mississippi River to the Pacific Ocean. Made under the direction of the Secretary of War, in 1853-5, according to act of Congress of March 3, 1853, May 31, 1854, and August 5, 1854. | —Volume XII. | Book II. | Washington: | Thomas H. Ford, Printer. 1860.

Explorations and Surveys for a Railroad route from the Mississippi River to the Pacific Ocean. | War Department. | = | Route near the forty-seventh and forty-nth parallels, explored by **I. I. Stevens**, | Governor of Washington Territory, in 1853-'55. [pp. 9-358, 70 pl.] Zoological report.—Washington, D. C., 1860. [viii, (1), 399 pp., 47 pl.]

No. 5.—Report upon the fishes collected on the survey.—By Dr. **G. Suckley**, U. S. A. (pp. 307-368, with pl. i, xi, xv, xvi, xix, xx, xxxii, xxxiii, xlii, xliii, xliv, l, li, lv, lx, lxiii, lxvii, lxix, lxxii, lxxv, viz:

Chapter I. Report upon the Salmonidæ. pp. 307-349.)

Chapter II. Report upon the Fishes exclusive of the Salmonidæ. pp. 350-368.

[N. sp. *Salmo Masoni* (345).]

[This volume also appeared with the following title-page and modifications:—]

The Natural History of Washington Territory, with much relating to Minnesota, Nebraska, Kansas, Oregon and California, between the thirty-sixth and forty-ninth parallels of Latitude, being those parts of the final Reports on the Survey of the Northern Pacific Railroad Route, containing the Climate and Physical Geography, with full Catalogues and Descriptions of the Plants and Animals collected from 1853 to 1857. By **J. G. Cooper**, M. D., and Dr. **G. Suckley**, U. S. A., Naturalists to the Expedition. This edition contains a new preface, giving a sketch of the explorations, a classified table of contents, and the latest additions by the authors. With fifty-five new plates of scenery, botany, and zoology, and an isothermal chart of the route.—New York: Baillière Brothers, 440 Broadway. [etc.] 1859. [4°. xvii, 26 + 72 + viii, 399 pp. (+ 1-4 pp. betw. 368 and 369), 61 pl., 1 map.]

†Descriptions of the Californian Atherinidæ, with figures of the species. By **Wm. O. Ayres**, M. D. Oct. 1, 1860. < Proc. Cal. Acad. Sci., v. 2, pp. 73-77, 1860.

[N. sp. *Atherinopsis affinis*, *Atherinopsis tenuis*, with figures.]

†Descriptions of two new Sciænoids, with figures. By **Wm. O. Ayres**, M. D. Nov. 5, 1860. < Proc. Cal. Acad. Sci., v. 2, pp. 77-81, 1860.

[N. g. and sp. *Johnius nobilis*, *Seriphus* (n. g.) *politus*.]

†Description of new Californian fishes, with figures. By **Wm. O. Ayres**, M. D. Dec. 3, 1860. < Proc. Cal. Acad. Sci., v. 2, pp. 82-86, April, 1862.

[N. g. and sp. *Camarina* (n. g.) *nigricans*, *Poronotus simillimus*.]

1861—Observations on the genus Cottus, and description of two new species (abridged from the forthcoming report of Capt. J. H. Simpson), by **Theodore Gill**. March 20, 1861. < Proc. Boston Soc. Nat. Hist., v. 8, pp. 40-42. April, 1861.

[N. g. and n. sp. *Potamocottus* (n. g. 40), *Potamocottus punctulatus*.]

Description of a new species of the genus Tigoma of Girard (abridged from the forthcoming report of Capt. J. H. Simpson), by **Theodore Gill**. March 20, 1861. < Proc. Boston Soc. Nat. Hist., v. 8, p. 42, April, 1861.

[N. sp. *Tigoma squamata*.]

1861—Notes on the described species of Holconoti, found on the western coast of North America. By **Alexander Agassiz.** March 20, 1861. < Proc. Boston Soc. Nat. Hist., v. 8, pp. 122–134, 1861.

[The number of species is reduced to 15, which are grouped under 9 genera. N. g. *Tæniotoca* > *Embiotoca lateralis*; n. sp. *Hyperprosopon analis*,—neither described.]

† Communication on several new generic types of fishes, *i. e.*, Podothecus, Hoplopagrus, and Stephanolepis. By **Theodore Gill.** April 16, 1861. < Proc. Acad. Nat. Sci. Phila., [v. 13], pp. 77–78, 1861.

[N. g. and sp. *Podothecus* (n. g.).]

Revision of the genera of North American Sciæninæ. By **Theodore Gill.** April 30, 1861. < Proc. Acad. Nat. Sci. Phila., [v. 13], pp. 79–89, 1861.

[N. g. *Rhinoscion* (85) for *Amblodon saturnus* Grd., *Genyonemus* (87) for *Leiostomus lineatus* Ayres.]

On the Liostominæ. By **Theodore Gill.** April 30, 1861. < Proc. Acad. Nat. Sci. Phila., [v. 13], pp. 89–93, 1861.

[Remarks on *Leiostomus lineatus* (92).]

Salmonidæ of Frazer River, British Columbia. By **C. Brew.** < Edinburgh New Philos. Journ., v. 13, p. 164, 1861.

On the Haploidonotinæ. By **Theodore Gill.** May 28, 1861. < Proc. Acad. Nat. Sci. Phila., [v. 13], pp. 100–105, 1861.

[Remarks on *Amblodon saturnus* (105).]

Notices of Certain New Species of North American Salmonidæ, chiefly in the Collection of the N. W. Boundary Commission, in charge of Archibald Campbell, Esq., Commissioner of the United States, by Dr. C. B. R. Kennerly, Naturalist to the Commission. By **George Suckley,** M. D., late Assistant Surgeon, U. S. Army. Read before the New York Lyceum of Natural History, June, 1861. < Ann. Lyc. Nat. Hist. New York, v. 7, pp. 306–313, 1862.

[N. g. and sp. *Salmo Kennerlyi* (307), *Salmo brevicauda* (308), *Salmo Warreni* (308), *Salmo Bairdii* (309), *Salmo Parkei* (309), *Oncorhynchus* (n. g., 312), *Salmo Campbelli* (313).]

Notes on some genera of fishes of the western coast of North America. By **Theodore Gill.** July 30, 1861. < Proc. Acad. Nat. Sci. Phila., [v. 13], pp. 164–168, 1861.

[N. g. *Atractoperca* (164), *Archoplites* (165), *Parephippus* (165), *Hypsypops* (165), *Sebastodes* (165), *Acantholebius* (166), *Pleurogrammus* (166), *Grammatopleurus* (166), *Megalicottus* (166). *Olinocottus* (166), *Blennicottus* (166), *Anoplagonus* (167), *Brosmophycis* (168), *Hypsagonus.* (167), **Paragonus* (167).]

On new types of Aulostomatoids, found in Washington Territory. By **Theodore Gill.** July 30, 1861. < Proc Acad. Nat. Sci. Phila., [v. 13], pp. 168–170, 1861.

[N. g. and sp. *Aulorhynchus* (n. g., 169) *flavidus* (169).]

On the genus Podothecus. By **Theodore Gill.** Sept. 24, 1861. < Proc. Acad. Nat. Sci. Phila., [v. 13], pp. 258–261, Sept. 1861.

Description of a new generic type of Blennoids. By **Theodore Gill.** Sept. 24, 1861. < Proc. Acad. Nat. Sci. Phila., [v. 13], pp. 261–263, Sept. 1861.

[N. g. and sp. *Anoplarchus* (n. g., 261) *purpurescens* (262).]

1861—Catalogue of the Fishes in the British Museum. By **Albert Günther.** Volume third. London: printed by order of the trustees. 1861. [Oct.]

At first only entitled:—Catalogue of the Acanthopterygian Fishes in the Collection of the British Museum. By **Dr. Albert Günther.** Volume third. Gobiidæ, Discoboli, Oxudercidæ, Batrachidæ, Pediculati, Blenniidæ, Acanthoclinidæ, Comephoridæ, Trachypteridæ, Lophotidæ, Teuthididæ, Acronuridæ, Hoplognathidæ, Malacanthidæ, Nandidæ, Polycentridæ, Labyrinthici, Luciocephalidæ, Atherinidæ, Mugilidæ, Ophiocephalidæ, Trichonotidæ, Cepolidæ, Gobiesocidæ, Psychrolutidæ, Centriscidæ, Fistulariidæ, Mastacembelidæ, Notacanthi. London: printed by order of the Trustees. 1861. [Published in Oct. 8°. General title + xxv, 586 + x* pp.—10*s.* 6*d.*]

[N. g. and n. sp. *Cyclopterus orbis* (158), *Liparis cyclopus* (163), *Centronotus crista-galli* (359) = *Anoplarchus crista-galli* (564), *Psychrolutes* (n. g.) *paradoxus* (516).]

* Description of a new ichthyic form from the coast of Lower California. By **Wm. O. Ayres,** M. D. Dec. 1, 1861. < Proc. Cal. Acad. Sci., vol. 2, pp. 156–158, 1862.

[N. sp. *Cynoscion parvipinnis.*]

Analytical synopsis of the order Squali and revision of the nomenclature of the genera. By **Theodore Gill.** Dec. 16, 1861. < Ann. Lyc. Nat. Hist., N. Y., v. 7, pp. 368*–370* + 371–408, 1862.

Squalorum generum novorum descriptiones diagnosticæ. **Theodore Gill,** auctore. Dec. 16, 1861. < Ann. Lyc. Nat. Hist. N. Y., v. 8, pp. 409–413, 1862.

1862—Description of a new species of Hemilepidotus, and remarks on the group (Temnistiæ) of which it is a member. By **Theodore Gill.** Jan. 28, 1862. < Proc. Acad. Nat. Sci. Phila., [v. 14], pp. 13–14, 1862.

[N. sp. *Hemilepidotus Gibbsii* (13).]

On the subfamily of Argentininæ. By **Theodore Gill.** Jan. 28, 1862. < Proc. Acad. Nat. Sci. Phila., [v. 14], pp. 14–15, 1862.

[N. g. *Mesopus* (14) or *Hypomesus* (15).]

Note on the Sciænoids of California. By **Theodore Gill.** Jan. 28, 1862. < Proc. Acad. Nat. Sci. Phila., [v. 14], pp. 16–18, 1862.

[5 species enumerated.]

‡ Notice of fresh water Fishes taken in the Bay of San Francisco. By **Wm. O. Ayres,** M. D. Feb. 3, 1862. < Proc. Cal. Acad. Sci., vol. 2, p. 163, Sept. 1862.

[8 sp. specified.]

On the limits and arrangement of the family of Scombroids. By **Theodore Gill.** March 25, 1862. < Proc. Acad. Nat. Sci. Phila., [v. 14], pp. 124–127, 1862.

Description of new species of Alepidosauroidæ. By **Theodore Gill.** March 25, 1862. < Proc. Acad. Nat. Sci. Phila., [v. 14], pp. 127–132, 1862.

[N. sp. *Alepidosaurus* (*Caulopus*) *borealis* (128), *Alepidosaurus* (*Caulopus*) *serra* (129).]

Catalogue of the fishes of Lower California in the Smithsonian Institution, collected by Mr. J. Xantus. By **Theodore Gill.** Part I. March 25, 1862. < Proc. Acad. Nat. Sci. Phila., [v. 14], pp. 140–151, 1862.

On a new genus of fishes allied to Aulorhynchus, and on the affinities of the family Aulorhynchoidæ to which it belongs. By **Theodore Gill.** April 29, 1862. < Proc. Acad. Nat. Sci. Phila., [v. 14], pp. 233–261, 1862.

1862—Catalogue of the Fishes of Lower California, in the Smithsonian Institution, collected by Mr. J. Xantus. By **Theodore Gill.** Part II. April 29, 1862. < Proc. Acad. Nat. Sci. Phila., [v. 14], pp. 242–246, 1862.

Catalogue of the Fishes of Lower California, in the Smithsonian Institution, collected by Mr. J. Xantus. By **Theodore Gill.** Part III. May 27, 1862. < Proc. Acad. Nat. Sci. Phila., [v. 14], pp. 249–262, 1862.

Notice of a collection of the Fishes of California presented to the Smithsonian Institution by Mr. Samuel Hubbard. By **Theodore Gill.** June 24, 1862. < Proc. Acad. Nat. Sci. Phila., [v. 14], pp. 274–282, 1862.

[N. g. and sp. *Hypocritichthys* (n. g., 275) *analis* (275), **Brachyistius* (n. g., 275) *frenatus* (275), *Hyperprosopon Agassizii* (276), *Oxylebius* (n. g., 277) *pictus* (278), *Apodichthys sanguineus* (279), **Apodichthys inornatus* (279), *Parophrys Hubbardii* (281), *Alausa californica* (281), *Isoplagiodon* sp. (282).]

Synopsis of the species of Lophobranchiate Fishes of Western North America. By **Theodore Gill.** June 24, 1862. < Proc. Acad. Nat. Sci. Phila., [v. 14], pp. 282–284, 1862.

[N. g. and sp. *Dermatostethus* (n. g., 283) *punctipinnis* (283), *Syngnathus dimidiatus* (283 284).]

Catalogue of the Fishes in the British Museum. By **Albert Günther,** . . . . Volume fourth. London: printed by order of the trustees. 1862.

Also entitled:—Catalogue of the Acanthopterygii pharyngognathi and Anacanthini in the collection of the British Museum. . . . London: printed by order of the Trustees. 1862. [8°. General title + xxi, 534 pp.—8*s.* 6*d.*]

[N. sp. *Ditrema brevipinne* (248). *Pleuronectes Franklinii* (442), *Pleuronectes digrammus* (445), *Parophrys Ayresii* (456).]

Notes on the family of Scombroids. By **Theodore Gill.** July 29, 1862. < Proc. Acad. Nat. Sci. Phila., [v. 14], pp. 328–329, 1862.

Note on some genera of Fishes of Western North America. By **Theodore Gill.** July 29, 1862. < Proc. Acad. Nat. Sci. Phila., [v. 14], pp. 329–332, 1862.

[N. g. and sp. *Eucyclogobius* (n. g., 330), *Caularchus* (n. g., 330), *Eumicrotremus* (n. g., 330) *Hypsifario* (n. g., 330), *Lepidopsetta* (n. g., 330), *Hypsopsetta* (n. g., 330), *Orthopsetta* (n. g., 330), *Uropsetta* (n. g., 330), *Hydrolagus* (n. g., 331), *Gyropleurodus* (n. g., 331), *Holorhinus* (n. g., 331), *Entosphenus* (n. g., 331). 42 genera are stated to have been added to the Californian fauna, either as entirely new or in substitution for others erroneously identified, since the publication of Girard's work.]

On the classification of the families and genera of the Squali of California. By **Theodore Gill.** Oct. 28, 1862. < Proc. Acad. Nat. Sci. Phila., [v. 14], pp. 483–501, 1862.

[N. g. and sp. *Rhinotriacis* (n. g., 486) *Henlei* (486).]

‡ Statement in regard to Sebastes rosaceus and S. ruber. By **Wm. O. Ayres,** M. D. Nov. 3, 1862. < Proc. Cal. Acad. Sci., v. 2, p. 207, January, 1863.

* Description of Fishes believed to be new. By **Wm. O. Ayres.** M. D. Nov. 3, 1862. < Proc. Cal. Acad. Sci., v. 2, pp. 209–211, January, 1863.

[N. sp. *Sebastodes flavidus*, *Sebastodes ovalis*.]

* Remarks in relation to the fishes of California which are included in Cuvier's genus Sebastes. By **Wm. O. Ayres,** M. D. Nov. 3, 1862. < Proc. Cal. Acad. Sci., v. 2, pp. 211–218, January, 1863.

1863—Notices of certain new species of North American Salmonidæ, chiefly in the collection of the N. W. Boundary Commission. By **George Suckley**, M. D. See 1861, June.

1863—The Resources of California, comprising Agriculture, Mining, Geography, Climate, Commerce, etc., etc. and the past and future development of the State. By **John S. Hittel**.—San Francisco: A. Roman & Company. New York: W. J. Middleton. 1863. [12°, xvi, 464 pp.]

[Zoology, chap. vi (pp. 140–146); fishing (pp. 313-317).]

List of the Fishes sent by the Museum [of Comparative Zoology] to different Institutions, in exchange for other specimens, with Annotations. By **F. W. Putnam**. < Bull. Mus. Comp. Zool., No. 1, = v. 1, pp. 2–16, March 1, 1863.

* Remarks in relation to the genus Notorhynchus. By **Wm. O. Ayres**, M. D. March 2, 1863. < Proc. Cal. Acad. Sci., v. 3, p. 15, April, 1863.

Catalogue of the Fishes of Lower California, in the Smithsonian Institution, collected by Mr. J. Xantus. By **Theodore Gill**. Part IV. March 31, 1863. < Proc. Acad. Nat. Sci. Phila., [v. 15], pp. 80–88, 1863.

Descriptions of some new species of Pediculati, and on the classification of the group. By **Theodore Gill**. March 31, 1863. < Proc. Acad. Nat. Sci. Phila., [v. 15], pp. 88–92, 1863.

On an unnamed generic type allied to Sebastes [Sebastoplus, Gill]. By **Theodore Gill**. August 25, 1863. < Proc. Acad. Nat. Sci. Phila., [v. 15], pp. 207–209, 1863.

[Contains reference to Ayres's views on the Californian *Sebastoids*.]

* Remarks on ichthyic types new to the California Coast. By **Wm. O. Ayres**, M. D. Sept. 7, 1863. < Proc. Cal. Acad. Sci., v. 3, p. 66, Nov. 1863.

[N. sp. (undescribed) *Scomberesox* n. sp., *Alopias* n. sp.]

Synopsis of the Pomacentroids of the Western Coast of North and Central America. By **Theodore Gill**. Sept. 29, 1863. < Proc. Acad. Nat. Sci. Phila., [v. 15], pp. 213–221, 1863.

Notes on the Labroids of the Western Coast of North America. By **Theodore Gill**. Sept. 29, 1863. < Proc. Acad. Nat. Sci. Phila., [v. 15], pp. 221–224. 1863.

Synopsis of the North American Gadoid Fishes. By **Theodore Gill**. Sept. 29, 1863. < Proc. Acad. Nat. Sci. Phila., [v. 15], pp. 229–242, 1863.

Descriptions of the genera of Gadoid and Brotuloid Fishes of Western North America. By **Theodore Gill**. Sept. 29, 1863. < Proc. Acad. Nat. Sci. Phila. [v. 15], pp. 242–254, 1863.

Synopsis of the family of the Lycodoidæ. By **Theodore Gill**. Sept. 29, 1863. < Proc. Acad. Nat. Sci. Phila., [v. 15], pp. 254–262, 1863.

Descriptions of the Gobioid genera of the Western Coast of Temperate North America. By **Theodore Gill**. Sept. 29, 1863. < Proc. Acad. Nat. Sci. Phila., [v. 15], pp. 262–267, 1863.

[N. g. and sp. *Coryphopterus* (n. g., 262) *glaucofrænum* (263).]

On New Genera and Species of California Fishes.—No. I. By **J. G. Cooper**, M. D. Nov. 3, 1863. < Proc. Cal. Acad. Nat. Sci., v. 3, pp. 70–77, Nov. 1863.

[N. g. and n. sp. *Dekaya* (n. g.) *anomala*, *Ayresia* (n. g.) *punctipinnis*, *Orcynus pacificus*.]

1863—Notes on the Sebastoid Fishes occurring in the Coast of California. By **Wm. O. Ayres**, M. D., C. M. D. S. Nov. 10, 1863. < Proc. Zool. Soc. London —, pp. 390–402, 1863.

On New Genera and Species of California Fishes.—No. II. By **J. G. Cooper**, M. D. Nov. 16, 1863. < Proc. Cal. Acad. Nat. Sci., v. 3, pp. 93–97, Dec. 1863.

[N. sp. *Exocœtus californicus*, *Urolophus Halleri*.]

Description of the genus Stereolepis Ayres. By **Theodore Gill**. Nov. 24, 1863. < Proc. Acad. Nat. Sci. Phila., [v. 15], pp. 329–330, 1863.

Description of the genus Oxyjulis Gill. By **Theodore Gill**. Nov. 24, 1863. < Proc. Acad. Nat. Sci. Phila., [v. 15], pp. 330–331, 1863.

1864—Catalogue of the Fishes in the British Museum. By **Albert Günther**, . . . Volume fifth. London: printed by order of the trustees. 1864.

Also entitled:—Catalogue of the Physostomi, containing the families Siluridæ, Characinidæ, Haplochitonidæ, Sternoptychidæ, Scopelidæ, Stomiatidæ, in the collection of the British Museum. . . . London: published by order of the Trustees. 1864. [8°. (Including general title) xxii, 455 pp.]

Beschreibung des Heterodontus Phillipii Bl. (Cestracion Phillipii Cuv.) mit Rücksicht auf seine fossilen Verwandten. Von **Johannes Strüver** (Göttingen). Dresden, 1864. [4°. 32 pp, 2 pl.] <Verhandl. K. Leopold-Carol. Akad. der Naturf., v. 31.

On new Genera and Species of Californian Fishes.—No. III. By **J. G. Cooper**, M. D. Jan. 4, 1864. <Proc. Cal. Acad. Nat. Sci., v. 3, pp. 108–114, 1864.

[N. g. and sp. *Myxodes* (or *Gibbonsia*, n. g.) *elegans*, *Gillichthys* (n. g.) *mirabilis*, *Pteroplatea marmorata*.]

Description of a new Labroid genus allied to Trochocopus, Gthr. By **Theodore Gill**. Mar. 29, 1864. < Proc. Acad. Nat. Sci. Phila., [v. 16], pp. 57–59, 1864.

[N. g. *Pimelometopon* (58), *Sebastomus* (59), *Sebastosomus* (59).]

Note on the nomenclature of Genera and Species of the family Echeneidoidæ. By **Theodore Gill**. Mar. 29, 1864. < Proc. Acad. Nat. Sci. Phila., [v. 16], pp. 59–61, 1864.

Critical remarks on the genera Sebastes and Sebastodes of Ayres. By **Theodore Gill**. May 31, 1864. < Proc. Acad. Nat. Sci. Phila., [v. 16], pp. 145–147 1864.

[N. sp. *Sebastosomus pinniger* (147), *Sebastosomus simulans* (147).]

Second contribution to the Selachology of California. By **Theodore Gill**. May 31, 1864. < Proc. Acad. Nat. Sci. Phila., [v. 16], pp. 147–151, 1864.

[N. sp. *Mustelus californicus* (148), *Notorhynchus borealis* (150).]

†Several points in Ichthyology and Conchology, viz: Percopsis Hammondii, n. sp., Paralepidoids and Alepidosauroids, Gymnotoids, and Campeloma vice Melantho. By **Theodore Gill**. June 7, 1864. < Proc. Acad. Nat. Sci. Phila., [v. 16], pp. 151–152, 1864.

†Ayresia punctipinnis named Chromis punctipinnis *fide* Gill. By **J. G. Cooper**, M. D. July 18, 1864. < Proc. Cal. Acad. Sci., v. 3, p. 160, 1864.

1864—Note on the Paralepidoids and Microstomatoids, and on some peculiarities of Arctic Ichthyology. By **Theodore Gill**. Sept. 27, 1864. < Proc. Acad. Nat. Sci. Phila., [v. 16], pp. 187–189, 1864.

Synopsis of the Cyclopteroids of Eastern North America. By **Theodore Gill**. Sept. 27, 1864. < Proc. Acad. Nat. Sci. Phila., [v. 16], pp. 189–194, 1864.

Synopsis of the Pleuronectoids of Californian and North-western America. By **Theodore Gill**. Sept. 27, 1864. < Proc. Acad. Nat. Sci. Phila., [v. 16], pp. 194–198, 1864.

Description of a new generic type of Pleuronectoids in the Collection of the Geological Survey of California. By **Theodore Gill**. Sept. 6, 1864. < Proc. Acad. Nat. Sci. Phila., [v. 16], pp. 198–199, 1864.

[N. g. and sp. *Metoporops* (n. g., 198) *Cooperi* (199).]

Note on the family of Stichæoids. By **Theodore Gill**. Sept. 7, 1864. < Proc. Acad. Nat. Sci. Phila., [v. 16], pp. 208–211, 1864.

1865—Note on the family of Myliobatoids, and on a New species of Ætobatis. By **Theodore Gill**. April 3, 1865. < Ann. Lyc. Nat. Hist. New York, v. 8, pp. 135–138, May, 1865.

[N. sp. *Myliobatis californicus* (137), *Ætobatis laticeps* (137).]

On the Genus Caulolatilus. By **Theodore Gill**. April 25, 1865. < Proc. Acad. Nat. Sci. Phila., [v. 17], pp. 66–68, 1865.

On the Cranial Characteristics of Gadus [Microgadus] proximus, Grd. By **Theodore Gill**. April 25, 1865. < Proc. Acad. Nat. Sci. Phila., [v. 17], p. 69, 1865.

[N. g. *Microgadus*.]

Note on several Genera of Cyprinoids. By **Theodore Gill**. April 25, 1865. < Proc. Acad. Nat. Sci. Phila., [v. 17], pp. 69–70, 1865.

Some remarks on Labrus pulcher (Ayres). By **Albert Günther**, M.A., M. D., Ph. D. May 30, 1865. < Proc. Acad. Nat. Sci. Phila., [v. 17], p. 77, 1865.

On a new Generic type of Sharks. By **Theodore Gill**. Sept. 26, 1865. < Proc. Acad. Nat. Sci. Phila., [v. 17], p. 177, 1865.

[N. g. and sp. *Mieristodus* (n. g., 177) *punctatus* (177).]

Histoire naturelle des Poissons ou Ichthyologie générale par **Aug. Duméril** Professeur-administrateur au Muséum d'Histoire Naturelle de Paris.—Ouvrage accompagné de planches.—Tome premier [.] Élasmobranches [i. e.] Plagiostomes et Holocéphales ou Chimères.—Première partie [-Seconde partie]. . . . Paris. Librairie Encyclopédique de Roret, ... 1865, [Text, 2 p. l., pp. 1–352; seconde partie, 2 p. l., pp. 353–720.] [8°; atlas larger 8°, pl. 1–14, pp. 1–8.]

Vancouver Island and British Columbia. Their History, Resources, and Prospects. By **Matthew Macfie**, F. R. G. S., five years resident in Victoria, V. I. London: Longman, Green, Longman, Roberts, & Green, 1865. [8°, xx pp. (including blank leaf and frontispiece), 1 l., 574 pp., 2 maps.]

Chapter V. General Resources of Vancouver's Island. pp. 131–171.

Fisheries. pp. 163–171.

1866—Catalogue of the Fishes in the British Museum. By **Albert Günther**, ... Volume sixth. London: printed by order of the trustees. 1866.

Also entitled:—Catalogue of the Physostomi, containing the families Salmonidæ, Percopsidæ, Galaxidæ, Mormyridæ, Gymnarchidæ, Esocidæ, Umbridæ, Scombresocidæ, Cyprinodontidæ, in the collection of the British Museum. . . . London: printed by order of the Trustees. 1866. [8° xv, 368 pp.]

[N. sp. *Salmo lordii* (148).]

The Naturalist in Vancouver Island and British Columbia. By **John Keast Lord**, F. Z. S., Naturalist to the British North American Boundary Commission. [Vignettes.] In two volumes. Vol. I [—II]. London: Richard Bentley, New Burlington Street, publisher in ordinary to Her Majesty. 1866. [2 vols., 12°. Vol. i, xiv (incl. frontisp.), 2, 358 pp., 8 pl.; vol. ii, vii (incl. frontisp.), 2, 375 pp., 5 pl.]

Volume i.

Chapter II.—Victoria—The Salmon: its haunts and habits. pp. 36–61.
Chapter III.—Fish Harvesting. pp. 62–96.
Chapter IV.—The Round-fish, Herrings, and Viviparous Fish. pp. 97–120
Chapter V.—Sticklebacks and their Nests—The Bullhead—The Rock-cod—The Chirus—Flatfish. pp. 121–141.
Chapter VI.—Halibut Fishing—Dogfish—A trip to Fort Rupert—Ransoming a Slave—A promenade with a Red skin—Bagging a Chief's head—Queen Charlotte's Islanders at Nanaimo. pp. 142–174.
Chapter VII.—Sturgeon-spearing—Man-sucker—Clams. pp. 175–198.

Volume ii.

Appendix.
List of Fishes collected in the Salt and Fresh Waters of Vancouver Island and British Columbia. pp. 351–356.

[In the list are enumerated species which almost certainly were not "collected" in the waters in question.]

Hr. **W. Peters** machte eine Mittheilung über Fische (*Protopterus*, *Auliscops*, *Labrax*, *Labracoglossa*, *Nematocentris*, *Serranus*, *Scorpis*, *Opisthognathus*, *Scombresox*, *Acharnes*, *Anguilla*, *Gymnomuræna*, *Chilorhinus*, *Ophichthys*, *Helmichthys*). < Monatsberichte der Königl. Akademie der Wissenschaften zu Berlin, 1866, pp. 509–526, 1 pl.

[N. g. and sp. *Auliscops* (n. g., 510) *spinescens* (510), *Scombresox brevirostris* (521).]

1867—On the identity of the genus Alepisaurus Lowe with Plagyodus Steller. By Dr. **Albert Günther**. < Ann. and Mag. Nat. Hist., (4), v. 19, pp. 185–187.

On the nourishment of the fœtus in the Embiotocoid Fishes. By **James Blake**, M. D., F. R. C. S. Jan. 21, 1867. < Proc. Cal. Acad. Nat. Sci., v. 3, pp. 314–317, Sept. 1867.

On the organs of Copulation in the Male of the Embiotocoid Fishes. By **James Blake**, M. D., F. R. C. S. Nov. 4, 1867. < Proc. Cal. Acad. Nat. Sci., v. 3, pp. 371–372, May, 1868.

1868—Some Recent Additions to the Fauna of California. By **J. G. Cooper**, M. D. Jan. 13, 1868. < Proc. Cal. Acad. Sci., v. 4, pp. 3–13, Nov. 1868.

[The number of fishes is stated (p. 3) to be 196 in 1868, against 133 known in 1862.]

Nourishment of the Fœtus in Embiotocoid Fishes. By **James Blake**, M. D., Lond., F. R. C. S. < Journ. Anat. and Physiol., v. 2, pp. 280–282.

1868—On the anal fin appendage of Embiotocoid Fishes. By **James Blake**, M. D., F. R. C. S., Professor of Obstetrics in Toland Medical College, St. Francisco, California. <Journ. Anat. and Physiol., v. 3, pp. 30–32, pl. 2, figs. 1 and 2, Nov. 1868.

The Natural Wealth of California. Comprising early history; geography, topography, and scenery; climate; agriculture and commercial products; geology, zoology, and botany; mineralogy, mines, and mining processes; manufactures; steamship lines, railroads, and commerce; immigration, population and society; educational institutions and literature; together with a detailed description of each county; its topography, scenery, cities and towns, agricultural advantages, mineral resources, and varied productions. By **Titus Fey Cronise**. San Francisco: H. H. Bancroft & Company. 1868. [8°, xvi, 696 pp.]

Chapter VII. Zoology. pp. 434–501.

Fishes. [By **J. G. Cooper, M. D.**] pp. 487–498.

Chapter XIII. Miscellaneous Subjects. pp. 668–684.

Fisheries. p. 680.

[The list of fishes was evidently prepared by Dr. J. G. Cooper, although only general acknowledgment for assistance was rendered in the preface. It was acknowledged by Dr. Cooper, as author, in the communication to the California Academy of Sciences, indicated above. Inasmuch as this was intended to be a complete enumeration of the fishes of California, the names are reproduced here.]

BONY FISHES.

Percidæ	Stereolepis	gigas	487	1
	Paralabrax	nebulifer	487	2
	Atractoperca	clathrata	487	3*
	Archoplites	interruptus	487	3*
Latilоidæ	Caulolatilus	anomalus	487	4
Sciænidæ	Rhinoscion	saturnus	488	5
	Leiostomus	lineatus	488	6
	Umbrina	undulata	488	7
	Atractoscion	nobile	488	8
	Seriphus	politus	488	9
Chætodontidæ	Parephippus	zonatus	488	10
	Girella	nigricans	488	11
Pomacentridæ	Glyphidodon	rubicundus	488	12
	Chromis	punctipinnis	488	13
Embiotocoidæ	Hysterocarpus	Traskii	489	14
	Embiotoca	Jacksoni	489	15
		argyrosoma	489	16
	Taeniotoca	lateralis	489	17
	Hypsurus	Caryi	489	18
	Damalichthys	vacca	489	19
	Phanerodon	furcatus	489	20
	Cymatogaster	aggregatus	489	21
	Rhacochelius	toxotes	489	22
	Amphistichus	argenteus	489	23
	Holconotus	rhodoterus	489	24
		pulchellus	489	25
	Hyperprosopon	argenteum	489	26
		arcuatum	489	27
		punctatum	489	28
	Hypocritichthys	analis	489	29
	Brachyistius	frenatus	489	30
	Abeona	minima	489	31
Labridæ	Trochocopus	pulcher	489	32
	Oxyjulis	modestus	489	33
Ceryphænidæ	Poronotus	simillimus	489	34
Scombridæ	Scomber	diego	489	35

* Repeated.

1868— BONY FISHES—Continued.

	Pelamys	lineolata	489	36
	Orcynus	pacificus	489	37
	Halatractus	dorsalis	490	38
	Trachurus	symmetricus	490	39
	Paratractus	boops	490	40
	Alepidosaurus	serra	490	41
Scombersocoidæ	Belone	exilis	490	42
Sphyrænidæ	Sphyræna	argentea	490	43
Atherinidæ	Chirostoma	californiensis	490	44
		affinis	490	45
		tenuis	490	46
Exocœtidæ	Exocœtus	californicus	490	47
Chiridæ	Chirus	constellatus	491	48
		pictus	491	49
		guttatus	491	50
	Acantholebius	nebulosus	491	51
	Oplopoma	pantherina	491	52
	Anoplopoma	merlangus	491	53
Gasterosteidæ	Gasterosteus	serratus	491	54
		plebius	491	55
		microcephalus	491	56
		Williamsonii	491	57
Scorpænidæ	Scorpæna	guttata	491	58
	Sebastes	nigrocinctus	491	59
		nebulosus	491	60
		auriculatus	491	61
		ruber	491	62
		ocellatus	491	63
		elongatus	491	64
		paucispinis	491	65
		ovalis	491	66
		flavidus	491	67
		melanops	491	68
		rosaceus	491	69
	Trichodon	lineatus	491	70
	Blepsias	trilobus ?	491	71
Cottidæ	Cottopsis	gulosus	492	72
		parvus	492	73
	Leptocottus	armatus	492	74
	Oligocottus	maculosus	492	75
		analis	492	76
		globiceps	492	77
	Leiocottus	hirundo	492	78
	Scorpænichthys	marmoratus	492	79
	Aspicottus	bison	492	80
	Hemilepidotus	spinosus	492	81
		Gibbsii	492	82
		notospilotus	492	83
	Calycilepidotus	lateralis	492	84
Blennidæ	Anarrichthys	ocellatus	492	85
	Xiphidion	mucosum	492	86
	Lumpenus	anguillaris	492	87
	Apodichthys	flavidus	492	88
	Cebedichthys	cristagalli	492	89
		violaceus	492	90
	Gunnellus	ornatus	492	91
Blennidæ	Blennius	gentilis	492	92
	Neoclinus	Blanchardi	492	93
	Pterogmathus	satiricus	492	94
	Heterostichus	rostratus	492	95
	Gibbonsia	elegans	492	96
Batrachidæ	Porichthys	notatus	492	97
Gobidæ	Lepidogobius	gracilis	492	98

168— BONY FISHES—Continued.

	Eucyclogobius	newberrii	492	99
	Gillichthys	mirabilis	492	100
Cyclopteridæ	Caularchus	reticulatus	493	101
	Liparis	pulchellus	493	102
		mucosus	493	103
Pleuronectidæ	Hippoglossus	californicus	493	104
		vulgaris	493	105
	Platichthys	stellatus	493	106
	Parophys	vetulus	493	107
	Parophrys?	Ayresii	493	108
	Platessa?	bilineata	493	109
	Paralichthys	maculosus	493	110
	Pleuronichthys	cœnosus	493	111
		Hubbardii	493	112
	Hypsopsetta	guttulata	493	113
	Psettichthys	melanostictus	493	114
		sordidus	493	115
	Metoponops	cooperi	493	116
Gadidæ	Merlucius	productus	493	117
	Brosmophycis	marginatus	493	118
	Gadus	proximus	493	119
	Ammodytes	personatus	493	120
Ophidiidæ	Ophidion	Taylori	493	121
Salmonidæ	Salmo	quinnat	494	122
		Scouleri	494	123
		Masoni	494	124
		stellatus	494	125
		iridea	494	126
	Coregonus	Williamsonii	494	127
	Hypomesus	pretiosus	494	128
	Osmerus	thaleichthys	494	129
Scopelidæ	Synodus	lucioceps	495	130
Clupeidæ	Alausa	californica	495	131
	Clupea	mirabilis	495	132
	Meletta	cærulea	495	133
	Engraulis	mordax	495	134
		delicatissimus	495	135
		compressus	495	136
		nanus	495	137
Cyprinodontidæ	Cyprinodon	californiensis	495	138
	Fundulus	parvipinnis	495	139
		——?	495	140
Muræenidæ	Muræna	mordax	495	141
	Ophidiurus	californiensis	495	142
Cyprinidæ	Catostomus	occidentalis	495	143
		labiatus	495	144
	Acomus	generosus?	495	145
	Myliopharodon	robustus	496	146
		conocephalus	496	147
	Mylocheilus	fraterculus	496	148
	Ptychocheilus	grandis	496	149
		lucius	496	150
		rapax	496	151
	Gila	robusta	496	152
		elegans	496	153
	Luxilus	occidentalis	496	154
	Tigoma	conformis	496	155
		crassa	496	156
	Siboma	crassicauda	496	157
	Orthodon	microlepidotus	496	158
	Algansea	formosa	496	159
	Lavinia	exilicauda	496	160
		harengus	496	161

1868—	BONY FISHES—Continued.			
	Pogonichthys	inæquilobus	496	162
		symmetricus	496	163
		argyreiosus	496	164
	CARTILAGINOUS FISHES.*			
——	Orthagoriscus	analis	497	165
——	Gastrophysus	politus	497	166
——	Hippocampus	ingens	497	167
——	Syngnathus	californiensis	497	168
		griseolineatus	497	169
		leptorhynchus	497	170
		dimidiatus	497	171
		arundinaceus	497	172
	Dermatostethus	punctipinnis	497	173
——	Antaceus	brachyrhynchus	497	174
		acutirostris	497	175
		mediorostris	497	176
——	Hydrolagus	Colliei	497	177
——	Notorhynchus	maculatus	498	178
——	Isoplagiodon	Heplei	498	179
	Triacis	semifasciatus	498	180
——	Gyropleurodus	Francisci	498	181
——	Acanthias	Sucklii	498	182
——	Sphyra	malleus	498	183
——	Alopias	vulpes	498	184
——	Rhina	californica	498	185
——	Rhinobatus	productus	498	186
——	Rhinoptera	vespertilio	498	187
——	Uraptera	binoculata	498	188
——	Torpedo	californica	498	189
——	Urolophus	Halleri	498	190
	Pteroplatea	marmorata	498	191
	Trygon	——?	498	192
——	Lampetra	plumbea	498	193
	Entosphenus	epihexodon	498	194
		ciliatus	498	195
——	Branchiostoma	——?	498	196

1868—Catalogue of the Fishes in the British Museum. By **Albert Günther**, . Volume seventh.—London: printed by order of the trustees. 1868.

Also entitled:—Catalogue of the Physostomi, containing the families H ropygii, Cyprinidæ, Gonorhynchidæ, Hyodontidæ, Osteoglossidæ, Clupe Chirocentridæ, Alepocephalidæ, Notopteridæ, Halosauridæ, in the collec of the British Museum. . . . London: printed by order of the Trus 1868. [8°, xx, 512 pp.]

1870—Alaska and Its Resources. By **William H. Dall**, Director of the Scien Corps of the late Western Union Telegraph Expedition. Boston: Lee Shepard. 1870. [8°, xii, 628 pp, 15 pl., 1 map.]

Part II.

Chapter VI. Fisheries, Fur Trade, and other resources not previo mentioned. pp. 481–505.

Appendix.

Appendix G. Natural History. pp. 576–594.

List of the fishes of Alaska. p. 579.

Marine Fishes. p. 579.

Fresh-water fishes of the Yukon. p. 579.

[The list is very imperfect.]

*No families are recognized among the so-called cartilaginous fishes. These are indicated b present writer by the lines in the family column.

1870—Mackerel-catching. [By **John C. Cremony.**] < Overland Monthly, v. 4, pp. 161–168, Feb. 1870.

The Pacific Coast Cod-fishery. [By Capt. **C. M. Scammon.**] < Overland Monthly, v. 4, pp. 436–440, May, 1870.

Catalogue of Fishes in the British Museum. By **Albert Günther,** . . . Volume eighth. London: printed by order of the trustees. 1870.

Also entitled:—Catalogue of the Physostomi, containing the families Gymnotidæ, Symbranchidæ, Muræniдæ, Pegasidæ, and of the [orders] Lophobranchii, Plectognathi, [and subclasses] Dipnoi, Ganoidei, Chondropterygii, Cyclostomata, Leptocardii, in the British Museum. . . . London: printed by order of the Trustees. 1870. [8°, xxv, 549 pp.]

[Sp. new to coast:—*Galeus canis* (379). N. g. *Ichthyomyzon* (506).]

Über einige Pleuronectiden, Salmoniden, Gadoiden und Blenniiden aus der Decastris-Bay und von Viti-Levu. Von **Franz Steindachner** und weil. Prof. Dr. **Rudolph Kner.** < Sitzb. K. Akad. Wissensch., B. 61, Abth. i, pp. 421–447, pl. 1, 1870.

[7 species identified as common to Decastris Bay and the American coast.]

Histoire naturelle des Poissons ou Ichthyologie générale par **Aug. Duméril** [,] Membre de l'Institut [,] professeur-administrateur au Muséum d'Histoire Naturelle de Paris.—Ouvrage accompagné de planches.—Tome second [.] Ganoïdes, Dipnés, Lophobranches. . . . . 1870.—Paris [,] Librairie Encyclopédique de Roret, ... 1870. [4 juin.—Text, 8°, 2 p. l., 624 pp.; Atlas, larger 8°, pl. 15–26, pp. 9–12, with half title.]

1871—The Food Fishes of Alaska. By **William Healy Dall.** < Rep. Comm. Agric., 1870, pp. 375–392, 1871.

[14 species specified: no new species described.]

Remarks on the mode of attack of the Thrasher Shark. By **George Davidson.** July 11, 1870. < Proc. Cal. Acad. Sci., v. 4, p. 127, April, 1871

1872—Notice of an apparently new marine animal from the Northern Pacific. By **P. L. Sclater,** M. A., Ph. D., F. R. S., Secretary of the Zoological Society of London. < Rep. 42d meeting Brit. Assoc. Adv. Sc., Aug. 1872, Tr. Sec., pp. 140–141.

Notice of a supposed new marine animal from Washington Territory, northwest America. [By **P. L. Sclater.**] < Nature, v. i, p. 436, Sept. 26, 1872.

[The supposed new animal was represented by "several specimens which at first sight appeared to resemble long thin peeled white willow-wand more than anything else." Mr. Sclater, in the first instance, "was inclined to regard them as possibly bones of one of the gigantic rays," and afterwards (when he had been told what they were!) "as the hardened notochord of a low organized fish." They were, in truth, the axial skeletons of Pennatulid zoophytes!!!

Über eine neue Gattung von Fischen aus der Familie der Cataphracti Cuv., Scombrocottus salmoneus, von der Vancouvers-Insel. Von **W. C. H. Peters.** < Monatsb. K. Preuss. Akad. Wissensch. Berlin, pp. 568–570, 1872.

[N. g. and sp. *Scombrocottus* (n. g., 568) *salmoneus* (569).]

Report of the Commissioners of Fisheries of the State of California for the years 1870 and 1871. Sacramento: T. A. Springer, State printer. 1872. [8°, col. title, 24 pp.]

1872—Arrangement of the families of Fishes, or classes Pisces, Marsipobranchii, a Leptocardii. Prepared for the Smithsonian Institution. By **Theodo Gill**, M. D., Ph. D. Washington: published by the Smithsonian Instit tion. November, 1872. (Smithsonian Miscellaneous Collections. 247.) [8 xlvi, 49 pp.]

42d Congress, 2d session. | Senate. | Ex. Doc. No. 34. | Message | from the President of the United States, | communicating, | in compliance with resolution of the 19th of January, 1869, information | in relation to t resources and extent of the fishing-grounds of the North | Pacific Ocea opened to the United States by the treaty of Alaska. [Washington: Go ernment Printing Office. 1872.—8°, 85 pp.]

On p. 2 entitled "The Fisheries and Fishermen of the North Pacific." **Richard D. Cutts.**

Preliminary Report of the United States Geological Survey of Wyoming, a portions of contiguous Territories, (being a second [really fourth] annu report of progress,) conducted under authority of the Secretary of the I terior, by F. V. Hayden, United States Geologist.—Washington: Gover ment Printing Office. 1872. [8°, 511 pp.]

Part IV. Special Reports.

VII. On the Fishes of the Tertiary Shales of Green River, Wyomi Territory. By Prof. **E. D. Cope.** pp. 425–431.

VIII. Recent Reptiles and Fishes. Report on the Reptiles and Fish obtained by the Naturalists of the Expedition. By **E. D. Cope, A.** pp. 432–442.

Preliminary Report of the United States Geological Survey of Montana, a portions of adjacent Territories; being a fifth annual report of progre By F. V. Hayden, United States Geologist.—Conducted under authority the Secretary of the Interior.—Washington: Government Printing Offi 1872. [8°, i–vi, 3–538 pp. (with 64 fig.), 2 pl., 5 maps folded.]

Part IV. Zoology and Botany.

VI. Report on the Recent Reptiles and Fishes of the Survey, collect by Campbell Carrington and C. M. Dawes. By **E. D. Cope, A.** pp. 467–476.

1873—A contribution to the Ichthyology of Alaska. By **E. D. Cope.** Jan. 17, 187 < Proc. Am. Phil. Soc. Phila., v. 13, pp. 24–32, 1873. [Extras, March 1 1873.]

[17 species enumerated: n. sp. *Salmo tudes, Spratelloides bryoporus, Xiphidium cruorem Centronotus laxus, Chirus balias, Chirus ordinatus, Chirus trigrammus, Ammodytes alascen Gadus periscopus, Gadus auratus, Bathymaster signatus, Pleuronectes arcuatus.*]

Note on the Scombrocottus salmoneus of Peters, and its identity with Anopl poma fimbria. By **Theodore Gill**, M. D. March 17, 1873. < Proc. C Acad. Sci., v. 5. pp. 56–57, 1873 (April); reprinted. < Ann. and Mag. Na Hist., (4), v. 12, pp. 74–75, Sept. 1873.

* The first shad (Alausa præstabilis DeKay) caught in the waters of Califo nia. By **S. R. Throckmorton.** May 5, 1873. < Proc. Cal. Acad. Sci., v. p. 85, May, 1873.

* On the introduction of exotic Food Fishes into the waters of California. **S. R. Throckmorton.** May 5, 1873. < Proc. Cal. Acad. Sci., v. 5, pp. 8 88, May, 1873.

United States Commission of Fish and Fisheries.—Part I.—Report on t condition of the sea-fisheries of the south coast of New England in 1871 an 1872. By **Spencer F. Baird**, Commissioner.—With supplementary papers.- Washington: Government Printing Office. 1873. [8°, xlvii, 852 pp., 40 pl with 38 l. explanatory (to pl. 1–38), 1 folded map.]

1872—

Notes on Liparis and Cyclopterus. By **F. W. Putnam.** August, 1873. <Proceedings of the American Association for the Advancement of Science, vol. 22, B, pp. 335–340, June, 1874.

1873—Annual Record of Science and Industry for 1872. Edited by **Spencer F. Baird,** with the assistance of eminent men of science.—New York: Harper & Brothers, Publishers, Franklin Square. 1873. [12°.]

I. Pisciculture and the Fisheries.

Fish Culture in California, pp. 407, 408.
Report of California Fish Commissioners, p. 408, 409.
Stocking California waters with Trout, p. 409.
Transporting Black Bass to California, p. 409.
Transferring Shad to the Sacramento River, p. 430.
Stocking California with Shad, p. 430.
Oil-works on Unalaschka, p. 436.
Spawning of Cod-fish in Alaska, p, 436.
Cod-fishing in the Shumagin Islands, p. 436.
Salmon Fisheries in the Columbia River, p. 440.
Capture of Sacramento Salmon with the Hook, p. 441.
Fisheries of the Shumagin Islands, p. 444.
Peculiarities of Reproduction of California Salmon, pp. 445, 446.
Alleged Discovery of Young Shad in the Sacramento River, p. 447.

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See. also. 1875.

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[N. g. and n. sp. *Plagopterus* (n. g., 130), *argentissimus* (130), *Lepidomeda* (n. g., 131), *Lepidomeda vittata* (131), *Lepidomeda jarrovii* (132), *Clinostomus tænia* (133), *Rhinichthys henshawii* (133), *Hybopsis timpanogensis* (134), *Minomus platyrhynchus* (134), *Minomus jarrovii* (135), *Ceratichthys ventricosus* (136), *Myloleucus parovanus* (136), *Clinostomus phlegethontis* (137), *Uranidea wheeleri* (138).]

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Shipments eastward of California Salmon, p. 433.
Shad in the Sacramento River, p. 449.
Shad in California waters, p. 449.
Pacific Cod-fisheries of 1873, p. 458.
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Report of the Commissioner. pp. i–xcii.

Appendix B.—The Salmon and the Trout, (species of Salmo). pp. 89–384.

III.*—On the North American species of Salmon and Trout. By **George Suckley**, Surgeon, United States Army. (Written in 1861.) pp. 91–160.

VI.—Report of operations during 1872 at the United States Salmon-Hatching Establishment on the M'Cloud River, and on the California Salmonidæ generally; with a list of specimens collected. By **Livingston Stone**. pp. 168–215.

XII.—On the Speckled Trout of Utah Lake, Salmo virginalis, Girard. By Dr. **H. C. Yarrow**, U. S. A. [etc.]. pp. 363–368.

XIII.—Miscellaneous notes and correspondence relative to Salmon and Trout. (pp. 369–379), viz:—

D—On the edible qualities of the Sacramento Salmon. [By **S. R. Throckmorton.**] pp. 373–374.

E—On the Salmon-Fisheries of the Sacramento River. By **Livingston Stone.**] pp. 374–379.

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[4 Californian species mentioned.]

Ichthyologische Beiträge (III). Von **Franz Steindachner.** 17. Juni 1875. <Sitzb. K. Akad. Wissensch., B. 72, Abth. i, pp. 29–96, 1875.

[12 Californian species particularized: n. sp. *Xenichthys californiensis*, *Scorpis californiensis*, *Corvina stearnsii*, *Otolithus californiensis*, *Atherinops* n. g. or n. s. g. >*Atherinopsis affinis* Ayres.]

Description of a New Species of Trout from Mendocino County. [Typical specimen in the collection of California Academy of Natural Sciences.] By **W. R. Gibbons**, Alameda. June 22, 1875. <Proc. Cal. Acad. Sci., v. 6, pp. 142–144.

[n. sp. *Salmo mendocinensis.*]

California Fishplanting. [Signed **E. J. Hooper.**] <Forest and Stream, v. 5, pp. 19, 20, Aug. 19, 1875.

Trouting in Colorado. [Signed "Warren."] <Forest and Stream, v. 5, p. 35, Aug. 26, 1875.

Edible Fish of the Pacific. [Signed **E. J. Hooper.**] <Forest and Stream, v. 5, p. 36, Aug. 26, 1875.

Salmon Fishing east and west—How they take them in California. [Signed **Horace D. Dunn.**] <Forest and Stream, v. 5, p. 38, Aug. 26, 1875.

* These numbers are continuous through the volume and not subordinated to the parts.

1875—California Salmon. When to take them with a fly. [Signed "Podgers."] <Forest and Stream, v. 5, pp. 53, 54, Sept. 2, 1875.

Salmon Scores from the McCloud River. [By Sir **Rose Price.**] <Forest and Stream, v. 5, p. 54, Sept. 2, 1875.

Fishing in Montana. [Signed **A. B. Keeler.**] <Forest and Stream, v. 5, p. 54, Sept. 2, 1875.

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Shipments of California Salmon eggs. [By **Livingston Stone.**] <Forest and Stream, v. 5, p. 179, Oct. 28, 1875.

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Illegal traffic in Salmon. <Forest and Stream, v. 5, p. 217, Nov. 11, 1875.
[From *San Francisco Daily Evening Post.*]

Progress of Fish-culture in California. [By **E. J. Hooper.**] <Forest and Stream, v. 5, pp. 19.—227, Nov. 18, 1875.

The Oregon Salmon Fisheries. [*Anon.*] <Forest and Stream, v. 5, p. 230, Nov. 18, 1875.

Comparative size of Trout in Europe and America. [By **S. C. C.** i. e. **Clarke.**] <Forest and Stream, v. 5, p. 230, Nov. 18, 1875.

On what do Salmon Feed? [Editorial from **E. J. Hooper's** observations.] <Forest and Stream, v. 5, p. 280, Dec. 9, 1875.

Distribution of California Ova. <Forest and Stream, v. 5, p. 291, Dec. 16, 1875.

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[2 west-coast species described.]

Truckee River Trout. [*Anon.*] <Forest and Stream, v. 5, p. 308, Dec. 23, 1875.

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Alaska Cod-fisheries in 1873. p. 424.

Stocking a pond in Utah with Eels. p. 428.

Destruction of Fish on the Oregon coast with nitro-glycerine, p. 428.

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Chapter VIII.—Fish and Fisheries. The Fisheries of Alaska. pp. 165–167.
[This is essentially a second edition of the report of Mr. Elliott, published in 1873.]

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[Consisting of the separately paged Bulletins Nos. 1, 2, "First Series," and of the continuously paged Bulletins Nos. 1 to 6 inclusive, "Second Series," furnished with xiii pp. extra (title, table of contents, etc.). The distinction "Series" is not maintained after No. 6, which completes vol. 1.]

First Series, 1874.

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Chapter VI.—Report | upon | the collections of Fishes | made in portions of | Nevada, Utah, California, Colorado, New Mexico, and Arizona, | during | the years 1871, 1872, 1873, and 1874. | By | Prof. **E. D. Cope** and Dr. **H. C. Yarrow.**=pp. 635–703, pl. 26–32.

Appendix.—Description of a Mugiloid Fish from the Mesozoic Strata of Colorado [Syllaemus latifrons, Cope], pp. 701–703.

[N. sp. *Apocope conesii*, Yarrow (p. 648, pl. 27, f. 2), *Gila nigra*, Cope (p. 663, pl. 30, f. 3), *Gila seminuda*, Cope and Yarrow (p. 666, pl. 31, f. 1), *Hyborhynchus siderius*, Cope (p. 670, pl. 31, f. 6,) *Gila ardesiaca* (p. 660, pl. 30, f. 1), *Gila seminuda* (p. 666, pl. 31, f. 1), *Pantosteus*, Cope (n. g., p. 673), *Catostomus fecundus* (p. 678, pl. 32, f. 1).

"The most extended list is that of the Colorado basin" (p. 699):—

Cyprinidæ	**Plagopterus**	**argentissimus**	**640**
	Meda	**fulgida**	**642**
	Lepidomeda	**vittata**	**642**
		jarrovii	**643**
	Ceratichthys	**squamilentus**	**000**
		oscula	**647**
	Apocope	**conesii**	**648**
		ventricosa	**648**

1875—

	Gila	**egregia**	**662**
		nigra	**663**
		robusta	**663**
		elegans	**664**
		gracilis	**665**
		grahamii	**665**
		nacrea	**666**
		seminuda	**666**
		emorii	**667**
	Hyborhynchus	**siderius**	**670**
Catostomidæ	**Pantosteus**	**bardus**	**673**
		delphinus	**673**
	Catostomus	**insigne**	**676**
		discobolus	**677**
	Ptychostomus	**congestus**	**680**
Coregonidæ	**Coregonus**	**villiamsonii**	**682**
Salmonidæ	**Salmo**	**pleuriticus**	**693**
Cyprinodontidæ	**Girardinus**	**sonoriensis**	**695**
Cottidæ	**Uranidea**	**vheelerii**	**696**

"The following species are those of the basin of Utah, whether from tributaries of the Great Salt Lake or not" (p. 700):—

Cyprinidæ	**Apocope**	**carringtonii**	**645**
		henshavii	**645**
		vulnerata	**646**
	Ceratichthys	**biguttatus**	**651**
	Hybopsis	**timpanogensis**	**654**
		bivittatus	**000**
	Gila	**phlegethontis**	**657**
		montana	**657**
		hydrophlox	**658**
		tænia	**658**
		egregia	**662**
	Siboma	**atraria**	**667**
	Myloleucus	**pulverulentus**	**669**
		parovanus	**669**
Catostomidæ	**Pantosteus**	**platyrhynchus**	**673**
		jarrovii	**674**
	Catostomus	**fecundus**	**678**
Coregonidæ	**Coregonus**	**villiamsonii**	**682**
Salmonidæ	**Salmo**	**virginalis**	**685**
		pleuriticus	**693**
Cottidæ	**Uranidea**	**vheelerii**	**696**
		punctulata	**697**

[In both of the preceding lists the enumeration is in the order of the descriptions, and *not* of the lists, which deviate considerably from the former.]

1876.—Salmon Fishing on the Mayo River, California. [Anon.] <Forest and Stream, v. 5, p. 267, 1876.

California Salmon for New Hampshire. <Forest and Stream, v. 5, p. 339, Jan. 6, 1876.

The McCloud River Reservation. [Editorial.] <Forest and Stream, v. 5, p. 355, Jan. 13, 1876.

Habits of Pacific Salmon. [By **Livingston Stone.**] <Forest and Stream, v. 5, p. 372, Jan. 20, 1876.

California Shad. [Anon.] <Forest and Stream, v. 5, p. 372, Jan. 20, 1876. (6 lines.)

Angling for Eastern Salmon (*Salmo salar*) in California waters. [*Anon.*] <Forest and Stream, v. 5, p. 390, Jan. 27, 1876.

1876—The Fisheries and Sea Lions of California. [Anon.] < Forest and Stream, v. 6, p. 387, Feb. 24, 1876.

The Natural and Economic History of the Salmonidæ—geographical distribution and artificial culture. By **Philo-Ichthyos.** < Forest and Stream, pp. 68–69 (No. 3), 106 (No. 4), 116 (No. 5), 131 (No. 6), 147 (No. 7), 164 (No. 8), 179 (No. 9).

Check List of the Fishes of the Fresh Waters of North America. By **David S. Jordan,** M. S., M. D., and **Herbert E. Copeland,** M. S. March 3, 1876. < Bulletin of the Buffalo Society of Natural Sciences, v. 2, pp. 133–164, 1876.

Viviparous Perch: [their abundance at Santa Barbara. By **H. C. Yarrow.**] < Forest and Stream, v. 6, p. 132, April 6, 1876.

Angling for Smelts in California. [By **E. J. Hooper.**] < Forest and Stream, v. 6, p. 166, April 20, 1876.

A Viviparous Perch. [Editorial.] < Forest and Stream, v. 6, p. 180, with fig., April 27, 1876.

Noget om Slægten Soulv (*Anarrhichas*) og dens nordiske Arter. Af Proffessor **Japetus Steenstrup.** Med en Tavle. < Videnskabelige Meddelelser fra den Naturhistorisk Forening i Kjobenhavn, 1876, pp. 159–202, tav. 3.

Salmon Fisheries on the Columbia River. [*Anon.* By **Barnet Phillips.**—From Appleton's Journal.] < Rod and Gun, v. 8, pp. 131–132 (5 col.), May 27, 1876, with 2 figs.

Remarks on the Various Fishes [of the family of Scorpænidæ] known as Rock Cod. By **W. N. Lockington.** July 17, 1876. < Proc. Cal. Acad. Sci., v. 7, pp. 79–82.

[N. sp. *Sebastes Ayresii* proposed as a substitute for *S. rosaceus* of Ayres, but not of Girard.

Notes on Some California Marine Fishes, with description of a new species. By **W. N. Lockington.** July 17, 1876. < Proc. Cal. Acad. Sci., v. 7, pp. 83–88.

[N. sp. *Argyreiosus Pacificus*, Magdalena Bay.]

Ichthyologische Beiträge (V.) Von **Franz Steindachner.** 20. Juli 1876. < Sitzb. K. Akad. Wissensch., B. 74, Abth. i, pp. —, 1876.

[13 west-coast species elucidated: n. sp. *Artedius pugetensis*, *Siphagonus barbatus*, *Hypsagonus Swanii*, *Blakea* n. g. < *Myxodes elegans* Cooper.]

Lake Fishing in California. [By **E. J. Hooper.**] < Forest and Stream, v. 7, p. 5, Aug. 10, 1876.

Fishing this Season [summer of 1876] in California. [By **E. J. Hooper.**] < Forest and Stream, v. 7, p. 21, Aug. 17, 1876.

Notes on Californian Fishes. By **W. N. Lockington.** September 4, 1876. < Proc. Cal. Acad. Sci., v. 7, pp. 108–110.

[N. sp. *Centropomus viridis* (provisionally named on p. 100) from Asuncion Island, Lower California.]

Connecticut River Shad for California. [By **S. F. Baird.**] < Forest and Stream, v. 7, pp. 66–67, Sept. 7, 1876.

California Shad. [Anon.] < Forest and Stream, v. 7, p. 83, Sept. 14, 1876.

The Big Fish [Salmon weighing 100 pounds] of Alaska. [Anon.] < Forest and Stream, v. 7, pp. 213–214, Nov. 9, 1876.

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J. Pisciculture and the Fisheries. pp. 405–440.
Salmon in the San Joaquin. pp. 430–431.
Salmon Trade of the Columbia River. pp. 431–432.
Salmon in the Sacramento River. p. 432.
United States Salmon-hatching Establishment, pp. 434–435.

Engineer Department, U. S. Army.= Report of explorations across the Great Basin of the Territory of Utah for a direct wagon-route from Camp Floyd to Genoa, in Carson Valley, in 1859. By Captain **J. H. Simpson**, Corps of Topographical Engineers, U. S. Army [now colonel of engineers, bvt. brig. gen., U. S. A.]. Made by authority of the Secretary of War, and under instructions from Bvt. Brig. Gen. A. S. Johnston, U. S. Army, commanding the Department of Utah. Washington: Government Printing Office. 1876.

Explorations across the Great Basin of Utah.= Appendix L.—Report on ichthyology. By Prof. **Theo. Gill**. pp. 383–431, 8 pl., with 8 l. explanatory.

[This chapter was written in 1861, and not subsequently revised.]

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Report of the Commissioner. pp. vii-xlvi.

Appendix A.—Sea fisheries and the fishes and invertebrates used as food. pp. 1–319.

V.—Account of the fisheries and seal-hunting in the White Sea, the Arctic Ocean, and the Caspian Sea. By **Alexander Schultz**. pp. 35–96.

Appendix B.—The river fisheries. pp. 321–540.

XX.—Report of operations in California in 1873. By **Livingston Stone**. pp. 377–429.

A—Clear Lake. pp. 377–381.
B—Sacramento River. pp. 382–385.
C—California aquarium-car. pp. 385–390.
D—Overland journey with live shad. pp. 390–402.
E—The McCloud River station. pp. 402–423.
F—Catalogue of collections sent to the Smithsonian Institution in 1873. pp. 424–427.
G—A list of McCloud Indian words supplementary to a list contained in the report of 1872. pp. 428–429.

XXI.—Hatching and distribution of California salmon.

A—Report on California salmon-spawn hatched and distributed. By **J. H. Slack**, M. D. pp. 431–434.
B—Hatching and distribution of California salmon in tributaries of Great Salt Lake. By **A. P. Rockwood**, Superintendent of Fisheries in Utah Territory. pp. 434–435.

XXII.—Report of operations during 1874 at the United States salmon-hatching establishment on the McCloud River, California. By **Livingston Stone**. pp. 437–478.

XXIII.—Correspondence relating to the San Joaquin River and its fishes. pp. 479–483.

1877—The Trout of Washington Territory. <Forest and Stream, v. 7, p. 413, Feb. 1, 1877.

Canned Salmon. [*Anon.*] <Forest and Stream, v. 8, p. 32, Feb. 22, 1877.

On the Genera of North American Fresh-water Fishes. [By **David S. Jordan** and **Charles H. Gilbert.** Feb. 27, 1877. <Proc. Acad. Nat. Sc. Phila., v. —, pp. 83–104, April 17, 1877.

The Oregon Fisheries. [*Anon.* From "Pacific Life."] <Forest and Stream, v. 8, p. 49, March 1, 1877.

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Cultivation of Carp in California. p. 403.

Department of the Interior: U. S. National Museum.—Bulletin of the United States National Museum.—No. 7.—Published under the direction of the Smithsonian Institution. Washington: Government Printing Office. 1877. [8°.]

No. 7.—Contributions to the Natural History of the Hawaiian and Fanning Islands and Lower California. By **Thos. H. Streets**, M. D.

Trout Fishing in Southwestern Colorado. <Forest and Stream, v. 8, pp. 189, 190, May 3, 1877.

California Salmon Spawn for Shipment. <Forest and Stream, v. 8, p. 191, May 3, 1877.

Fishing in Lakes San Andreas and Pilercitas, California. [By **E. J. Hooper.**] <Forest and Stream, v. 8, p. 270, May 31, 1877.

Contributions to North American Ichthyology. Based Primarily on the Collections of the United States National Museum.

A. Notes on the Cottidæ, Etheostomatidæ, Percidæ, Centrarchidæ, Aphododeridæ, Dorysomatidæ, and Cyprinidæ. With Revisions of the Genera and Descriptions of New or Little-known Species.—B. Synopsis of the Siluridæ of the Fresh Waters of North America. By **David S. Jordan.** Washington: Government Printing Office. 1877. [8°, 2 title-pages, 120 pp., 45 plates.]

(Bulletin of the U. S. National Museum, No. 10.)

M'Cloud and Sacramento River Trout. [From "San Francisco Pacific Life."] <Forest and Stream, v. 8, p. 299, June 14, 1877.

Stocking the Barren Waters of the Great Divide. [By J. W. B.] <Forest and Stream, v. 8, p. 400, July 19, 1877.

California Salmon in Lake Ontario. [By **Sam. Wilmot.**] <Forest and Stream, v. 8, p. 419, July 26, 1877.

†California Salmon in the James River, Va. <Forest and Stream, v. 8, p. 400, July 19, 1877.

Hatching on the Columbia. <Forest and Stream, v. 8, p. 420, July 26, 1877.

1877—The Long-Jawed Goby. By **W. N. Lockington.** <The American Naturalist, v. 11, pp. 474–478, Aug., 1877.

[An interesting account of some peculiarities in the habits of *Gillichthys mirabilis*.]

The Coregoni—Their natural history, native waters, economic value, and implements connected with their production. [*Anon.*] <Forest and Stream, v. 8, pp. 439, 440. 1877.

The Coregoni. No. Part 2. <Forest and Stream, v. 9, pp. 3, 4, Aug. 3, 1877.

A Contribution to the knowledge of Ichthyological Fauna of the Green River Shales. By **E. D. Cope.** <Bull. U. S. Geol. and Geog. Surv. Terrs., v. 3, pp. 807–819, Aug. 15, 1877.

California Salmon. [By **Emery D. Potter.**] <Forest and Stream, v. 9, p. 63, Aug. 30, 1879.

Notice of the Utah Trout in Provo rising to the fly. By W. V. S. <Forest and Stream, v. 9, p. 88, Sept. 6, 1877.

Canning Salmon. <Forest and Stream, v. 9, p. 88, Sept. 6, 1877.

Operations of the McCloud River (Cal.) Fish Hatching Establishment. <Forest and Stream, v. 9, p. 206, Oct. 13, 1877.

The Salmon Fisheries of California. <Forest and Stream, v. 9, p. 233, Oct. 25, 1877.

Salmon Trout on the Pacific Coast. <Forest and Stream, v. 9, p. 247, Nov. 1, 1877.

More about McLeod River Trout. <Forest and Stream, v. 9, p. 247, Nov. 1, 1877.

The Sportsman's Gazetteer and General Guide. The Game Animals, Birds and Fishes of North America: their habits and various methods of capture. Copious Instructions in Shooting, Fishing, Taxidermy, Woodcraft, etc. Together with A Directory to the Principal Game Resorts of the Country; illustrated with maps. By **Charles Hallock,** Editor of "Forest and Stream"; Author of the "Fishing Tourist"; "Camp Life in Florida," etc. New York: "Forest and Stream" Publishing Company, American News Company, agents. 1877. [12°, 668 pp., + 208 pp., 3 maps, 1 portrait.

Part I.—Game Animals of North America. Fishes of the Northwest, pp. 339–353. Pacific Coast Fishes, pp. 354–369.

1878—Beneficial Results of Salmon Hatching on the Sacramento River. [Editorial.] <Forest and Stream, v. 10, p. 18, Feb. 14, 1878.

Trout Fishing at Lake Bigler, California. [*Anon.*] <Forest and Stream, v. 10, p. 28, Feb. 14, 1878.

California Salmon Fishing and the Game Laws. [Signed **E. J. Hooper.**] <Forest and Stream, v. 10, p. 47, Feb. 21, 1878.

[Price of first four Shad of the season in San Francisco=$10 each.] <Forest and Stream, v. 10, p. 67, Feb. 28, 1878.

Birds and Salmon in California. [*Anon.*] <Forest and Stream, v. 10, p. 95, March 14, 1878.

Spawning of California Salmon. [Signed **B. B. Redding.**] <Forest and Stream, v. 10, p. 155, April 4, 1878.

Red Trout, or Redfish of Oregon and Idaho. [By **Charles Bendire,** U. S. A.] <Forest and Stream, v. 10, p. 156, April 4, 1878.

Carp in San Francisco. [From "Pacific Life."] <Forest and Stream, v. 10, p. 174, April 11, 1878.

1878—The Norway Trout of the Yellowstone. [*Anon.*] <Forest and Stream, v. 10, p. 175 [195], April 11, 1878.

Prof. Jordan on Characteristics of Trout. [Signed **D. S. Jordan.**] <Forest and Stream, v. 10, p. 196, April 11, 1878.
[Contains suggestion that the original Redfish is *Hypsifario kennerlyi.*]

Manual of the Vertebrates of the Northern United States, including the District east of the Mississippi River and north of North Carolina and Tennessee, exclusive of marine species. By **David Starr Jordan**, Ph. D., M. D., Professor of Natural History in Butler University. Second Edition, revised and enlarged.—Chicago: Jansen, McClurg & Company, 1878. [12°. 407 pp., pub. May 16.]
[Contains synopsis of the American *Salmoninæ* and *Coregoninæ.*]

California Fishing Prospects. [Signed **E. J. Hooper.**] <Forest and Stream, v. 10, p. 239, May 2, 1878.

Notes on a Collection of Fishes from the Rio Grande, at Brownsville, Texas. By **David S. Jordan**, M. D. <Bull. U. S. Geol. and Geog. Surv. Terr. v. 4, [pp. 397–406, May 3;] v. 4, pp. 663–667, July 29, 1879.
[Specimens of *Hysterocarpus Traskii* indicated as an unknown Labroid form at p. 399, and described as the type of a new genus and sp. at p. 667. The specimens had been probably misplaced.]

A Catalogue of the Fishes of the Fresh Waters of North America. By **David S. Jordan**, M. D. <Bull. U. S. Geol. and Geog. Surv. Terr., v. 4, pp. 407–442, May 3, 1878.
[A simple nominal list of the fresh-water species north of the Mexican region.]

Spawning of California Brook Trout in New York. [By **James Annin, jr.**, Caledonia, N. Y.]. <Chicago Field, v. 9, p. 182, May 4, 1878. [F. M.]

California Salmon on Long Island, success of. By a member of the South Side Club. <Chicago Field, v. 9, p. 182, May 4, 1878. [F. M.]

Trout Hybrids. [Possibility of intercrossing Eastern and Californian Trouts. Editorial.] <Forest and Stream, v. 10, p. 255, May 9, 1878.

California. [Notice of distribution of land-locked Salmon and Eastern Trout by Fish Commissioners.] <Forest and Stream, v. 10, p. 255, May 9, 1878.

The heaviest American Salmon. [Notice of one weighing 82 pounds caught at the mouth of the Columbia River. By **John Goudy.**] <Forest and Stream, v. 10, p. 265, May 9, 1878.

Salmon canning on Frazer River. [By **Fred. Mather.**] <Chicago Field, v. 9, p. 196, May 15, 1878. [F. M.]

[redacted]—A. On the Distribution of the Fishes of the Allegheny Region of South Carolina, Georgia, and Tennessee. With Descriptions of New or Little-known Species. By David S. Jordan and Alembert W. Brayton.—B. Synopsis of the Family Catostomidæ. By David S. Jordan. Washington: Government Printing Office. 1878. (8vo, 237.)

Run of Salmon in California. Note by **A. R.** <Chicago Field, v. 9, p. 229, May 25, 1878. [F. M.]

Shad in California. Announcement of two taken in San Francisco Bay May 1. Note by **B. B. Porter.** <Chicago Field, v. 6, p. 229, May 25, 1878. [F. M.]

California Salmon. [Notice of their ascent up the McCloud and Sacramento rivers in May.] <Forest and Stream, v. 10, p. 350, June 6, 1878.

Salmon canning in Oregon and California. [Editorial. With three woodcuts.] <Forest and Stream, v. 10, p. 398, June 27, 1878.

1878—Another shipment of Shad to California. Notice by **Fred. Mather.** <Chicago Field, v. 9, p. 308, July 6, 1878. [F. M.]

California Salmon in Lake Ontario. [By **John J. Robson.**] <Forest and Stream, v. 10, p. 482, July 25, 1878.

Salmon canning in Alaska. An account of the objections of the Indians to the landing of a lot of Chinese fish canners. From Alaska Cor. "N. Y. Sun." <Chicago Field, v. 9, p. 371, July 27, 1878. [F. M.]

Notes on a Collection of Fishes from Clackamas River, Oregon. By **David S. Jordan,** M. D. <Proc. U. S. Nat. Museum, v. 1, pp. 69–85, Aug., 1878.

The Labrador and Columbia River Fisheries. [From the "New York Sun."] <Forest and Stream, v. 10, p. 507, Aug. 1, 1878.

The Mysterious Salmon. A quotation from the "Astorian" on the subject of the salmon taking the artificial fly, with editorial comment by **Fred. Mather.** <Chicago Field, v. 9, p. 387, Aug. 3, 1878. [F. M.]

The McCloud River Hatchery. [By **K. B. Pratt.**] <Forest and Stream, v. 11, p. 2, Aug. 8, 1878.

Fish Gossip: Abundance of Salmon in the McCloud River, and their annoyance to anglers when fishing for Trout. [Item from "San Francisco Chronicle," with editorial comment by **Fred. Mather.** <Chicago Field, v. 9, p. 403, Aug. 10, 1878. [F. M.]

Gameness of the Quinnat Salmon. [By **Tarleton H. Bean.**] <Chicago Field, v. 10, p. 4, Aug. 17, 1878. [F. M.]

The Fraser River Salmon Season. [From the "New York World."] <Forest and Stream, v. 11, p. 50, Aug. 22, 1878.

Fishing in Northern California. [By **E. J. Hooker.**] <Forest and Stream, v. 11, p. 51, April 22, 1878.

Trout Fishing in Truckee River. Correspondent of the "Sacramento Union." <Chicago Field, v. 10, p. 20, Aug. 24, 1878. [F. M.]

Trouting in Nevada. Catching them in the water-works at Gold Hill and Virginia City. [From "Virginia City Chronicle."] <Chicago Field, v. 10, p. —. Sept. 14, 1878. [F. M.]

Good News from California. [An account of fish-ladders in the Truckee River, from the "Truckee Republican."] <Chicago Field, v. 10, p. 84, Sept. 21, 1878.

Salmon One Cent Each. [Item from Frazer River, from California paper, with editorial comment by **F. Mather.**] <Chicago Field, v. 10, p. 101, Sept. 28, 1878. [F. M.]

Salmon Canning on Columbia River. An account of the process, with statistics. By **Fred. Mather.** <Chicago Field, v. 10, p. 101, Sept. 28, 1878. [F. M.]

Note on the Saurus lucioceps of Ayres. [By **W. N. Lockington.**] <Ann. & Mag. Nat. Hist. (5), v. 2, pp. 348, 349, Oct., 1878.

McCloud River Hatching Station. Daily Record of Salmon taken. [Signed **Livingston Stone.**] <Forest and Stream, v. 11, p. 203, Oct. 10, 1878.

California Trout in New York. [By **Seth Green.**] <Forest and Stream, v. 11, p. 203, Oct. 10, 1878.

McCloud River Hatchery. [Table of Distribution of Salmon Eggs during 1878.] <Forest and Stream, v. 11, p. 222, Oct. 17, 1878.

1878—Land-locking the Quinnat Salmon. Experiment of **H. G. Parker**, Commissioner on Fisheries for Nevada, in Pyramid and Walker Lakes. <Chicago Field, v. 10, p. 165, Oct. 26, 1878. [F. M.]

The Yellowstone as a Trout stream. [*Anon.*] <Forest and Stream, v. 11, p. 263, Oct. 31, 1878.

Another Devil Fish Story. Account of devil-fish (*Ceratoptera*) interfering with a submarine diver, from California paper. <Chicago Field, v. 10, p. 181, Nov. 2, 1878. [F. M.]

Walks around San Francisco. By **W. N. Lockington**. No- III.—Lake Honda and Seal Rock. <Am. Nat., v. 12, pp. 786–793, Dec., 1878.
[N. Sp. *Bdellostoma Stoutii*, p. 793.]

Note.—"No. I.—The Ocean Beach" (v. 12, pp. 347–354) and [No. II.—] "The Bay Shore" (v. 12, pp. 505–512) have nothing relative to fishes.

Salmo quinnat in France. [By **Fred. Mather.**] <Forest and Stream, v. 11, p. 360, Dec. 5, 1878. [See, also, pp. 339, 340, Nov. 28, 1878.]

On the occurrence of Stichæus punctatus, (Fabr.) Kröyer, at St. Michæl's, Alaska. By **Tarleton H. Bean.** <Proc. U. S. Nat. Museum, v. 1, pp. 279–281, Dec. 17, 1878.

Report on the collection of Fishes made by Dr. Elliott Coues, U. S. A., in Dakota and Montana during the seasons of 1873 and 1874. By **David S. Jordan**, M. D. <Bull. U. S. Geol. and Geog. Surv. Terr., v. 4. pp. 777–799, Dec. 11, 1878.
Note.—[Contains an "analysis of the genera of American Cyprinidæ, and reference of Pacific slope genera to European types, at pp. 785–790.]

California Salmon in Holland. [Editorial.] <Forest and Stream, v. 11, p. 420, Dec. 25. 1878.

45th Congress, 3d session. } House of Representatives. { Ex. Doc. 1, pt. 2. Vol. II. | = | Annual Report | of the | Chief of Engineers | to the | Secretary of War | for the | year 1878. | — | In three parts. | — | Part III. | — | Washington: | Government Printing Office. | 1878. |

Appendix NN. | — | Annual Report of Lieutenant **George M. Wheeler**, | Corps of Engineers, for the fiscal year ending | June 30, 1878. [pp. 1421—

Appendix K. | Report upon the Fishes collected during the years 1875, 1876, and 1877, in | California and Nevada, by Prof. **David S. Jordan** and **H. W. Henshaw**. [pp. 1609–1622, pll. 1–4.]

Appendix K 1. | List of Marine Fishes collected on the coast of California near Santa | Barbara in 1875, with notes by Dr. **H. C. Yarrow**, Acting Assistant Surgeon | U. S. A., and **H. W. Henshaw**. [pp. 1623–1627.]
P. 1610, pl. 1, 2, *Catastomus tahoensis* Gill and Jordan.
P. 1610, pl. 3, *Catastomus arœopus* Jordan.
P. 1619, pl. 4, *Salmo Henshawi* Gill and Jordan.

The Sportsman's Gazetteer and General Guide. The Game Animals, Birds, and Fishes of North America: Their Habits and Various Methods of Capture. Copious Instructions in Shooting, Fishing, Taxidermy, Woodcraft, etc. Together with maps. By **Charles Hallock**, Editor of "Forest and Stream"; Author of the "Fishing Tourist," "Camp Life in Florida," etc. Fourth Edition. New York: Forest and Stream Publishing Co. 1878. (12mo.)

1878—Manual of the Vertebrates of the Northern United States, Including the District East of the Mississippi River, and North of North Carolina and Tennessee, exclusive of Marine Species. By **David Starr Jordan**, Ph. D., M. D., Professor of Natural History in Butler University. Second Edition, Revised and Enlarged. Chicago: Jansen, McClurg & Co. 1878. (12mo, 407 pp.)

The Californian Salmon. With an Account of its Introduction into Victoria. By Sir **Samuel Wilson**, Member of the Legislative Council of Victoria. Melbourne: Sands & McDougall, Printers, Collins street West. 1878.

1879.—The Nevada Fish-hatchery. [From Carson City "Appeal."] <Chicago Field, v. 10, p. 332, Jan. 4, 1879. [F. M.]

Capture of a Devil-fish [Ceratoptera]. From California paper. <Chicago Field, v. 10, p. 395, Feb. 1, 1879. [F. M.]

The Fisheries and Other Resources of Alaska. By **H. A. R.** <Chicago Field, v. 10, p. 395, Feb. 1, 1879. [F. M.]

Viviparous Perch [Embiotocidæ. By **Charles Hallock**. From "Sportsman's Gazetteer."] <Forest and Stream, v. 11, p. 513, Jan. 23, 1879.

Fish and Fishing of Oregon. [By **Wm. Lang.**] <Forest and Stream, v. 12, p. 35, Feb. 13, 1879.

Report of the Nevada Fish Commission. [Notice by **Fred. Mather.**] <Chicago Field, v. 11, p. 3, Feb. 15, 1879.

Rapid growth of the California Salmon. [*Anon.*] <Forest and Stream, v. 12, p. 55, Feb. 20, 1879.
[An abstract from the "German Fishing Gazette."]

Eastern Trout on the Pacific Slope. [By **H. H. Holt**, Kaloma, W. T. <Forest and Stream, v. 12, p. 105, March 13, 1879.

Rearing Whitefish in confinement. [By **B. B. Redding.**] <Chicago Field, v. 11, pp. 67, 68, March 15, 1879.

Interesting Facts from Washington Territory. [By **Chs. Bendire.**] <Forest and Stream, v. 12, p. 154, March 27, 1879.
[Refers to "*Salmo Kennerlyi*", &c.]

The Flounders of our Markets. Read by **W. M. Lockington** before the San Francisco Acad. of Sciences, March 17, 1879. <Scientific Press Supplement, April, 1879; Mining and Scientific Press, April 12 and 19, 1879.

Salmon Fishing in Oregon. [By **H. B.**] <Forest and Stream, v. 12, p. 174, April 3, 1879.

Traits of Rocky Mountain Trout. [By **W. N. Byers.**] <Forest and Stream, v. 12, p. 174, April 3, 1879.

[Notice of a "'Devil Fish' recently taken on the Pacific coast whose body was four feet long, with a spear-shaped tail and tentacles seven feet long," *i. e.*, a species of Ceratoptera. From the "Santa Barbara Press."] <Chicago Field, v. 11, p. 148, April 19, 1879.

Description of a species of *Lycodes* (*L. Turneri*) from Alaska, believed to be undescribed. By **Tarleton H. Bean.** <Proc. U. S. Nat. Museum, v. 1, pp. 463–466, April 25, 1879.

The Fishes and Birds of the Pacific Coast. [By **Calamink**, *pseudon* of **John L. Wilson.** <Chicago Field, v. 11, p. 163, April 26, 1879.

[Note relative to the Fisheries of British Columbia. Notice of Report to House of Commons.] <Chicago Field, v. 11, p. 165, April 26, 1879.

1879—Notes on some Fishes of the Coast of California. No. I. By **W. N. Lockington.** <Am. Nat., v. 13, pp. 299–308, May, 1879.

California Mountain Trout in Eastern Waters. [By **Seth Green.**] <Forest and Stream, v. 12, p. 264, May 8, 1879.

[See, also, v. 12, p. 288.]

Trout and Salmon Season in California. [*Anon.*] <Forest and Stream, v. 12, p. 277, May 8, 1879.

Angling in California. [Abstract from "Pacific Life."] <Chicago Field, v. 11, pp. 195, 196, May 10, 1879.

[Catfish in California.] <Chicago Field, v. 11, p. 196, May 10, 1879.

Pacific Trout [Salmo iridea] in Eastern Waters. [Note signed **H. W. De Long,** with description appended from Hallock's Sportsman's Gazetteer.] <Forest and Stream, v. 12, p. 288, May 15, 1879.

Does the Western Salmon die after spawning? [By MAJOR, *pseudon.*] <Chicago Field, v. 11, p. 221, May 17, 1879.

California Salmon do not all die after spawning. [By **B. B. Redding.**] <Chicago Field, v. 11, p. 236, May 24, 1879.

The Roe of the Salmon the Indian's Bait. [By **Jonas C.**, Portland, Oregon.] <Chicago Field, v. 11, p. 237, May 24, 1879.

California News. [Notice of expected consignment of eggs from U. S. Commission Fish and Fisheries. *Anon.* From Sacramento "Record-Union."] <Chicago Field, v. 11, p. 244, May 31, 1879.

On a new Genus of Scombridæ. By **W. N. Lockington.** <Proc. Acad. Nat. Sci. Phila. [v. —], pp. 133–136.

[N. g. and sp. *Chriomitra* (p. 153) *concolor*, p. 134.]

Who branded the Salmon? [Notice of capture of four salmon branded with W. at Westport, Oregon. By **Geo. H. Heather.**] <Chicago Field, v. 11, p. 260, June 7, 1879.

Lake Tahoe. [*Anon.* From "Philadelphia Press."] <Chicago Field, v. 11, p. 260, June 7, 1879.

Grand Success of Shad and Salmon Culture. [By **B. B. Redding.**] <Chicago Field, v. 11, p. 277, June 14, 1879.

Salmon at the Antipodes, being an account of the successful introduction of Salmon and Trout into Australian waters. By Sir **Samuel Wilson,** Member of the Legislative Council of Victoria, [etc.]; author of a work on the Angora Goat, and papers on the Ostrich, the Chinese Yam, etc. London: Edward Stanford, 55, Charing Cross, S. W., 1879. [3d ed., 12°, viii, 252 pp., 1 phot. pl., 1 map folded.]

Partial Contents.

Chap. V. The first introduction of Californian Salmon Ova. pp. 24–25.
Chap. VII. The second importation of Californian Salmon Ova. pp. 29–38.
Chap. VIII. The Californian Salmon. pp. 39–58.
Chap. IX. Is the Californian Salmon suitable to the Murray River? pp. 59–66.
Chap. XIX. The Growth and Development of the Salmonidæ. pp. 160–172.
Chap. XXII. The Distribution and Liberation of the Californian Salmon Fry. pp. 193–244.

[Introduction dated June 16, 1879.

"The substance of this work, in a slightly different form, under the title of 'The Californian Salmon,' was originally published in the Transactions of the Zoological and Acclimatization Society of Melbourne for the year 1878, and a second small edition was reprinted in Victoria."—From "Preface to the third edition."—See 1878]

1879—The Chinese and other Fishermen of California. [Condensed from San Francisco "Chronicle" by **Fred. Mather.**] <Chicago Field, v. 11, p. 291, June 21, 1879.

On the Occurrence of Hippoglossus vulgaris, Flem., at Unalashka and St. Michael's, Alaska. By **Tarleton H. Bean.** <Proc. U. S. Nat. Museum, v. 2, pp. 63–66, July 1, 1879.

Pacific Coast Shad. [By **William Lang.**] <Forest and Stream, v. 12, p. 487, July 24, 1879.

Notes on New and Rare Fishes. Read before the California Acad. Science by **W. N. Lockington.**] <Scientific Press Supplement, July, 1879; Mining and Scientific Press, Aug. 2 and 16, 1879.

Fish Notes from the Pacific Coast. [By **Robt. E. C. Stearns.**] <Chicago Field, v. 11, p. 389, Aug. 2, 1879.
[Extract from "American Naturalist."]

Curious Facts about Trout [*i. e.*, jumping from flume into water below. By **B. B. R.**, *i. e.* **B. B. Redding.**] <Chicago Field, v. 11, p. 404, Aug. 9, 1879.

Alaska in Summer.—Second Paper. [By "PISECO," *i. e.* **Lester Beardslee.**] <Forest and Stream, v. 13, p. 553, Aug. 14, 1879.
[Refers, inter alias, to capture and curing of salmon at Port Hunter.]

Largest Salmon on Record. [*Anon.*] <Forest and Stream, v. 13, p. 557, Aug. 14, 1879.
["VICTORIA, June 26.—A salmon that weighed 98 pounds when caught has been received here from the Skeena River Fishery by Mr. Turner, Mayor of Victoria. Its length is 5 feet 11 inches from nose to tail."]

Shad in the Columbia. [By "S."] <Forest and Stream, v. 13, p. 585, Aug. 28, 1879.
[Refers probably to *Pomolobus.*]

Trolling for Salmon. [*Anon.*] <Forest and Stream, v. 13, p. 588, Aug. 28, 1879.
[Relates to Columbia River.]

Oregon. [Record of a trout-fishing expedition. By **William Lang.**] <Forest and Stream, v. 13, p. 589, Aug. 28, 1879.

The McCloud River Fishery. [*Anon.*] <Forest and Stream, v. 13, p. 604, Sept. 4, 1879.

Salmon a Nuisance to Trout Fishers. [*Anon.* By **Fred. Mather.**] <Chicago Field, v. 12, p. 52, Sept. 6, 1879.

The North Pacific Codfishery. [By **W. N. Lockington.** Reprinted from "Pacific Life."] <Chicago Field, v. 12, p. 53, Sept. 6, 1879.

[Notice of Trout passing through flume under pressure of 376 pounds to the square inch. *Anon.*] <Chicago Field, v. 12, p. 53, Sept. 6, 1879.

[Notice of Catfish—Amiurus albidus?—5 to 15 inches long, taken in Sausal Lagoon, where planted three years before. *Anon.*] <Chicago Field, v. 12, p. 53, Sept. 6, 1879.

The Pacific Salmon Fisheries. [*Anon.*] <Chicago Field, v. 12, p. 69, Sept. 13, 1879.

[Notice of Catfish—Amiurus albidus?—taken in McCloud's Lake, Stockton. *Anon.*] <Chicago Field, v. 12, p. 69, Sept. 13, 1879.

The Trans-Continental Expedition of the California Fish Commissioners. [By H. A. L.] <Forest and Stream, v. 13, p. 645 (3 col.), Sept. 18, 1879.

1879—Review of the Pleuronectidæ of San Francisco. By **W. N. Lockington.** <Proc. U. S. Nat. Museum, v. 2, pp. 69–96, July 2—Sept. 19, 1879.
[N. sp. *Hippoglossoides Jordani*, p. 73; *Glyptocephalus Pacifcus*, p. 86; *Glyptocephalus zachirus*, p. 88.

[Notice of Catfish for Susan River and Eel Lake. *Anon.*] <Chicago Field, v. 12, p. 85, Sept. 20, 1879.

The first biennial report of the Nevada Commission. [Notice by **Fred. Mather.**] <Chicago Field, v. 12, p. 85, Sept. 20, 1879.

Habits of California River Salmon. [*Anon.* Extract from "Sacramento Bee."] <Chicago Field, v. 12, p. 100, Sept. 27, 1879.

Fish Culture Operations in California. [By **Livingston Stone.**] <Forest and Stream, v. 13, p. 685, Oct. 2, 1879.
[Refers to Salmon.]

Why Salmo Quinnat does not take the Fly. [*Anon.* by **Charles Hallock.** <Forest and Stream, v. 13, p. 685, Oct. 2, 1879.

Washington Territory. [By "MULTNOMAH," *pseudon.*] <Forest and Stream, v. 13, p. 687, Oct. 2, 1879.
[Relates to fishing in "the great Spokane country."]

Salmon Fishing on the Pacific. [Incomplete. By C. R.] <Forest and Stream, v. 13, p. 689, Oct. 2, 1879.

The Fishery of Mr. A. P. Rockwood [near Salt Lake City. *Anon.* From "The Juvenile Instructor."] <Chicago Field, v. 12, p. 115, Oct. 4, 1879.

Do Fish hear? [By **W. N. Lockington.** From "Pacific Life."] <Chicago Field, v. 12, p. 116, Oct. 4, 1879.

Trout in the Truckee. [*Anon.* From "Sacramento Bee."] <Chicago Field, v. 12, p. 117, Oct. 4, 1879.

California. [Record of good Grilse-fishing in September.] By **B. B. Redding** <Forest and Stream, v. 13, p. 715, Oct. 9, 1878.

The Game and Fish of Alaska. [By "PISECO," *i. e.* **Lester Beardslee,** U. S. N.] <Forest and Stream, v. 13, pp. 723–724, Oct. 16, 1879.

Salmon Eggs from the Pacific. [By **Livingston Stone.**] <Forest and Stream, v. 13, p. 725, Oct. 16, 1879.

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[The figure appears to represent *Hysiario kennerlyi.*]

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The Fishes of Klamath Lake, Oregon. By **E. D. Cope.** <Am. Nat., v. 13, pp. 784–785, Dec., 1879.

[N. sp. *Chasmistes luxatus* (p. 784); *Chasmistes brevirostris* (p. 785); *? Mylopharodon* sp. (785).]

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The North American Trout and Salmon. pp. 467–470.

Ichthyologische Beiträge (VIII). Von Dr. **Franz Steindachner.** <Sitzb. K. Akad. Wissensch., B. 80, Abth. i, pp. . ("Juli-heft.") [Author's extra, received by mail Oct. 22, 1879.]

[N. sp. *Corvina (Johnius) Jacobi*, San Diego, p. 3; n. g. and sp. *Typhlogobius californiensis*, San Diego, p. 24; and *Gobius Newberrii*, p. 17, *Engraulis ringens*, p. 62, also commented upon.]

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Department of the Interior:

U. S. NATIONAL MUSEUM.

— 12 —

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OF THE

UNITED STATES NATIONAL MUSEUM.

No. 12.

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1878.

ADVERTISEMENT.

This work is the twelfth of a series of papers intended to illustrate the collections of Natural History and Ethnology belonging to the United States and constituting the National Museum, of which the Smithsonian Institution was placed in charge by the act of Congress of August 10, 1846.

It has been prepared at the request of the Institution, and printed by authority of the honorable Secretary of the Interior.

JOSEPH HENRY,

Secretary of the Smithsonian Institution.

SMITHSONIAN INSTITUTION,

Washington, May, 1878.

CONTRIBUTIONS

TO

NORTH AMERICAN ICHTHYOLOGY.

BASED PRIMARILY ON THE

COLLECTIONS OF THE UNITED STATES NATIONAL MUSEUM.

III.

A.—On the Distribution of the Fishes of the Alleghany Region of South Carolina, Georgia, and Tennessee, with Descriptions of New or Little Known Species.

BY

DAVID S. JORDAN

AND

ALEMBERT W. BRAYTON.

B.—A Synopsis of the Family Catostomidæ.

BY

DAVID S. JORDAN.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
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CONTRIBUTIONS

TO

NORTH AMERICAN ICHTHYOLOGY.

No. 3.

A.

ON THE DISTRIBUTION OF THE FISHES OF THE ALLEGHANY REGION OF SOUTH CAROLINA, GEORGIA, AND TENNESSEE, WITH DESCRIPTIONS OF NEW OR LITTLE KNOWN SPECIES.

By David S. Jordan and Alembert W. Brayton.

This paper is based primarily on the collections made by the present writers, assisted by Mr. C. H. Gilbert, and a party of students from Butler University, during the past summer (1877), in various streams of South Carolina, Georgia, and Tennessee. For the purpose of a more complete discussion of questions of geographical distribution, the authors have brought together, with their own observations, those previously made on the fish-faunæ of the same streams by other writers, especially the observations on the fishes of the Tennessee Basin by Professor Agassiz;* those on the fishes of the basins of the Santee† (Catawba), Tennessee,‡ and Cumberland,‖ by Professor Cope, and on the fishes of the Cumberland, Tennessee, Alabama, and Altamaha

*Notice of a Collection of Fishes from the Southern Bend of the Tennessee River, in the State of Alabama. By L. Agassiz. < American Journal Sci. Arts, 1854, pp. 297–308 and 353–365.

†Partial Synopsis of the Fishes of North Carolina. By E. D. Cope. < Proc. Am. Philos. Soc. Phila. 1870, pp. 448–495.

‡On the distribution of Fresh-water Fishes in the Alleghany Region of South-western Virginia. By E. D. Cope, A. M. < Journal Acad. Nat. Sci. Phila. new series, vol. vi, part iii, January, 1869, pp. 207–247.

‖On some Etheostomine Perch from Tennessee and North Carolina. By E. D. Cope. < Proc. Am. Philos. Soc. 1870, pp. 261–270.

basins by Professor Jordan.* The purpose of this paper is to give a *résumé* of all that is certainly known in regard to the ichthyology of the seven hydrographic basins embraced in its scope, viz, the Santee, Savannah, Altamaha, Chattahoochee, Alabama, Tennessee, and Cumberland. For purposes of comparison, a table of distribution of species is added, which includes, in addition, what is known of the fish-faunæ of the James, Roanoke, Neuse, Great Pedee, and Ohio.

The following is a classified list of the streams which have been examined in each water-basin included in this paper, with a word or two suggestive of the character of each stream. The collections in every case were made by one or both of the present writers, unless otherwise stated.

LIST OF STREAMS EXAMINED.

I.—SANTEE BASIN.

1. Catawba River and tributaries in North Carolina. (Cope, 1869.)
2. Ennoree River, near Chick Springs, S. C. (Deep, muddy, and rapid.)
3. Reedy River, at Greenville Court-House, S. C. (Muddy.)
4. Saluda River, at Farr's Mills, west of Greenville. (Clear and rapid; a fine seining-ground.)

II.—SAVANNAH BASIN.

1. Tugaloo River, Habersham County, Ga., just below mouth of Panther. (Clear, broad rapids.)
2. Panther Creek, north of Toccoa City, Ga. (Clear mountain-stream.)
3. Toccoa Creek, below Toccoa Falls, Ga. (Clear, cold mountain-stream; contains little besides *Hydrophlox rubricroceus*.)
4. Toxaway and Chatuga Rivers and tributaries about the foot of Whiteside Mountain. (Clear mountain-streams, abounding in Trout.)

III.—ALTAMAHA BASIN.

1. Oconee River, at Sulphur Springs and Fuller's Mills, Hall County, Georgia. (Clear.)
2. Ocmulgee River, Reed's Fish-pond, south of Atlanta, Ga. (Headwaters; clear.)
3. Ocmulgee River, South Fork, Flat Rock, De Kalb County, Georgia. (Partly clear; a small falls, and a deep basin worn in granite rock; a fine stream for seining.)

* A Partial Synopsis of the Fishes of Upper Georgia; with Supplementary Papers on Fishes of Tennessee, Kentucky and Indiana. By David Starr Jordan, M. D., Ph. D < Annals N. Y. Lyceum Nat. Hist. vol. xi, 1877, pp. 307–377.

4. Ocmulgee River, Macon, Ga. (Collection of Dr. T. H. Bean and other members of the United States Fish Commission.)

IV.—CHATTAHOOCHEE BASIN.

1. Chattahoochee River at Shallow Ford, northwest of Gainesville, Ga. (Broad, shallow, rapid; water moderately clear.)
2. Suwannee Creek, near Suwannee, Gwinnett County, Ga. (Deep, muddy, and very cold. Contains chiefly *Codoma eurystoma*.)
3. Peach Tree Creek, just north of Atlanta. (Deep and muddy.)
4. Nancy's Creek, northwest of Atlanta. (Clear and rapid.)
5. Flint River, in Taylor County. (Collection of Dr. Hugh M. Neisler in United States National Museum.)

V.—ALABAMA BASIN.

A.—Etowah River.

1. Pettis Creek, near Cartersville, Ga. (Clear, rocky.)
2. Silver Creek, near Rome, Ga. (Clear, rapid; a fine stream for collecting.)
3. Dyke's Creek and Pond, near Rome, Ga. (Clear and cold.)

B.—Oostanaula River.

4. Rocky Creek, near Floyd Springs, Ga. (A fine, clear stream.)
5. John's Creek, near Floyd Springs. (Clear.)
6. Lovejoy's Creek, near Floyd Springs. (A small sandy stream, full of fishes.)
7. Big Armuchee Creek, above Rome. (Clear.)
8. Big Dry Creek, near Rome. (A succession of weedy rock-pools.)
9. Little Dry Creek, near Rome. (Like the preceding.)
10. Waters's Creek, above Rome. (Muddy and rocky.)
11. Lavender Creek, in Texas Valley, Ga. (A small clear stream.)

C.—Coosa River.

12. Beech Creek, near Rome. (Muddy.)
13. Horse-leg Creek, near Rome. (Rocky, clear.)
14. Little Cedar Creek, at Cave Spring, Ga. (A fine, clear, cold stream. One of the best for the collection of fishes. Abounds in *Xenisma stelliferum*, *Hydrophlox chrosomus*, *Codoma callistia*, and other beautiful species.)

D.—Alabama River, near Montgomery, Ala. (Collection of Dr. Bean and others, 1876.)

VI.—TENNESSEE BASIN.

A.—Upper Course.

1. Clinch River, tributaries in Southwestern Virginia. (Cope, 1868.)
2. Powell's River, near Cumberland Gap. (Clear.)
3. Indian Creek, near Cumberland Gap. (Clear.)
4. Station Creek, near Cumberland Gap. (Clear.)
5. Holston River, various tributaries in Southwestern Virginia. (Cope, 1868.)
6. French Broad River, at Newport, Tenn. (Rather deep and muddy.)
7. French Broad River, about Warm Springs, N. C., Asheville, N. C., and elsewhere.) (Cope, 1869.) (Rapid, rocky, and generally clear.)
8. Big Pigeon River, at Cliffton, Tenn. (Rather clear.)
9. Swannanoa River, at foot of Black Mountain. (Clear, cold mountain-stream, with trout.)

B.—Lower Course.

10. Chickamauga River, at Ringgold, Ga. (Rather clear and very rocky.)
11. Tributaries of Tennessee River, about Huntsville, Ala. (Agassiz; Newman's collection, 1853.)
12. Tributaries of Tennessee River, about Florence, Ala. (Storer, 1845.)
13. Elk River and tributaries, at Estill Springs, Tenn. (Clear, rocky, and cold.)

VII.—CUMBERLAND BASIN.

1. Round-Stone River, Rock Castle County, Kentucky. (Clear.)
2. Rock Castle River, Livingston, Ky. (Clear and rocky.)
3. Big Laurel River, Laurel County, Kentucky. (Clear.)
4. Cumberland River, about Pineville, Ky. (Clear, rocky.)
5. Yellow Creek, near Cumberland Gap. (Rather muddy.)
6. South Fork of Cumberland River, in Tennessee. (Cope, 1869.)
7. Cumberland River and tributaries, near Nashville. (Winchell, 1870.)
8. Stone River, Murfreesboro', Tenn. (Clear and rocky.)

It will be noticed that almost without exception the above mentioned localities are in the mountainous or upland parts of the different water-basins. Of the fishes inhabiting distinctively the lowland courses of most of the streams, little is yet definitely known.

The Santee, Savannah, Altamaha, and Chattahoochee have been examined only in that part of their course which flows over metamorphic rocks. The three western streams have been studied chiefly in the limestone regions. The lithological character of the bed of a stream has a certain influence on its fish-fauna, as will be seen hereafter. Generally limestone streams are richer in species than those with granitic bottoms.

The types of the new species described below are deposited in the United States National Museum at Washington, and in the Museum of Butler University, Indianapolis, Indiana.

I.—SANTEE BASIN.

Thirty-nine species are ascertained to occur in the headwaters of the Santee River, thirty-three having been obtained by Professor Cope in the Catawba River in North Carolina, and thirty by the present writers in the Saluda and Ennoree in South Carolina. Of these thirty nine species, ten are not as yet known from any other hydrographic basin. These are: *Alvordius crassus*, *Nothonotus thalassinus*, *Ceratichthys labrosus*, *Ceratichthys zanemus*, *Codoma pyrrhomelas*, *Codoma chloristia*, *Photogenis niveus*, *Alburnops chlorocephalus*, *Alburnops saludanus*, and *Myxostoma album*. The apparent absence of *Luxilus cornutus* in the Great Pedee, Santee, Savannah, Altamaha, and Chattahoochee Basins is remarkable, as that species is abundant in the tributaries of the Neuse on the east and the Alabama on the west, as in all streams northward to Minnesota and New England.

The species most abundant as to individuals, in the Saluda at least, is probably *Notropis photogenis*. Next to this come *Codoma pyrrhomelas* and *Ceratichthys biguttatus*. Of the *Catostomidæ*, *Myxostoma cervinum* seems to be the predominant species; of the *Siluridæ*, *Amiurus brunneus*, and of the *Centrarchidæ*, *Lepiopomus auritus*. The chief food-fishes at Greenville, S. C., are the "Mud Cats" (*Amiurus brunneus* and *platycephalus*), the "Fine-scaled Sucker" (*Catostomus commersoni*), the Eel (*Anguilla vulgaris*), the "Spotted Sucker" (*Minytrema melanops*), the "Perch" (*Lepiopomus auritus*), the "War-mouth Perch" (*Chænobryttus viridis*), the "Jack" (*Esox reticulatus*), and the "Jump Rocks" (*Myxostoma cervinum*).

ETHEOSTOMATIDÆ.

Genus ALVORDIUS *Girard.*

1. ALVORDIUS CRASSUS, *sp. nov.*

Etheostoma maculatum var. COPE, Proc. Am. Philos. Soc. 1870, 261, 262, and 449. (Not *Hadropterus maculatus* Girard.)

A species bearing considerable resemblance to *A. aspro*, but less distinctly marked and more heavily built, the form being less graceful than that of the other members of the genus. Body considerably compressed, the depth $4\frac{1}{2}$ times in length to origin of caudal (as in all cases in this paper). Head comparatively short, $3\frac{4}{5}$ in length; the snout medium, not acuminate as in *A. phoxocephalus*, nor especially obtuse. Eye moderate, as long as snout, 4 in head. Mouth rather small for the genus, nearly horizontal, the upper jaw but little the longer: upper jaw not projectile: maxillary reaching anterior margin of eye.

Cheeks naked: opercles with a few scales above: back and breast naked: middle line of belly in some specimens naked: in others with enlarged plates. Scales on the body rather larger than usual, about 7–55–7.

Fins moderately developed: dorsal XII–I, 10, varying to XI–I, 11; an increase in the number of the spines, as usual, accompanying a decrease in the number of soft rays, a rule apparently not hitherto noticed, and perhaps not of general application. The two dorsal fins are well separated, the first being longer than the second, but considerably lower.

Anal fin shorter, but higher than second dorsal, II, 9; the two spines well developed. Caudal fin deeply lunate, almost furcate. Pectorals and ventrals large, their tips about equal.

Coloration rather plain. General hue olivaceous; the back marked with darker, as in the other species of the genus. Sides with a series of dark olive, rounded blotches, connected along the lateral line by a narrow, dark band; a dark streak forward, and one downward from the eye. First dorsal with a dark spot in front, and another on its last rays. Second dorsal, caudal, and pectorals barred with dark spots. Anal and ventrals uncolored.

Length of longest specimens observed, 3 inches.

Habitat.—Saluda, Ennoree, and Reedy Rivers, in rapid water, especially abundant in the Saluda at Farr's Mills. Also recorded by Cope from the Catawba.

Genus BOLEOSOMA *DeKay.*

2. BOLEOSOMA MACULATICEPS *Cope.*

Boleosoma maculaticeps COPE (1870), Proc. Am. Philos. Soc. 269 and 450. (Catawba R.)—JORDAN & COPELAND (1876), Check List (Bull. Buffalo Soc. Nat. Hist.), 163. (Name only.)
Arlina maculaticeps JORDAN (1877), Bull. U. S. Nat. Mus. x, 15. (Name only.)
Boleosoma olmstedi JORDAN (1877), Ann. N. Y. Lyc. Nat. Hist. 368. (Ocmulgee River.)

A single specimen taken in the Saluda River at Farr's Mills answers closely to Professor Cope's description. The upper part of the cheeks have, however, a few scattering scales. This species is a true *Boleosoma.* Although the type of *Boleosoma* has but a single anal spine and *B. effulgens* and *B. maculaticeps* have two anal spines, the essential character of those spines is the same in both cases, and the genus *Arlina*, based on *B. effulgens*, is a synonym of *Boleosoma.* In *Boleosoma*, the spines are all weak and flexible, and those of the anal especially so. In most or all of the other genera of *Etheostomatidæ*, the anal spines are stiff and long, and, with scarcely an exception, the first spine is the longer of the two. In the species of *Boleosoma*, with *two* anal spines, the two spines are unequal, the second the longer, both extremely slender and flexible; not at all "spine"-like, except that they are not inarticulate. This feeble condition of the spines seems to constitute the chief generic character of *Boleosoma.*

Two of the species provisionally referred by Professor Jordan (Bull. U. S. Nat. Mus. x) to "*Arlina*", viz, *Arlina stigmæa* Jor. and *A. atripinnis* Jor., have the anal spines well developed, as usual in *Etheostomatidæ.* These two species and their congeners apparently constitute a distinct genus, differing from *Diplesium* in the toothed vomer and from *Nothonotus* in the protractile upper jaw. For this genus, the name of *Ulocentra* (Jordan) has been suggested (Man. Vert. ed. 2d, p. 223), in allusion to the development of the spines.

Genus NOTHONOTUS *Agassiz.*

3. NOTHONOTUS THALASSINUS, *sp. nov.*

A handsome species, differing from the others now referred to this genus in the entire nakedness of the head.

Body rather stout, the depth about 5 times in the length, compressed behind, the back somewhat arched. Head large, 4 in length, the snout rather blunt and convex in profile; a pretty decided angle

opposite the eye. Eyes large, high up, longer than the muzzle, 3½ in head: interorbital space rather narrow, the eye having some upward range. Mouth moderate, slightly oblique, the maxillary reaching to orbit. Upper jaw slightly longer than the lower, not protractile. Head entirely naked, both cheeks and opercles being destitute of scales.

Scales large, 5–43–5. Belly scaled: throat naked: neck anteriorly naked, but scaly in front of the dorsal: lateral line complete.

Fins all large: D, X–I, 10, or IX–I, 11, the membrane of the first dorsal continued to the base of the second: longest dorsal spine a little over half the length of the head, scarcely shorter than the soft rays; the base of the spinous dorsal a little longer than that of the soft dorsal. Anal II, 8, rather smaller than second dorsal, the first spine longer and larger than the second. Caudal fin deeply lunate, almost forked. Pectoral and ventral fins large; the former reaching nearly to the vent, the latter somewhat shorter.

Color, in spirits: Olive, closely mottled and tessellated above with dark green; this color extending down the sides, forming six or eight irregular dark green bars. Head dark green; a dark green line downward from eye and another forward. Fins in males nearly plain, the spinous dorsal with a black edge; females with all the fins except the ventrals closely barred or speckled with dark green. Two pale orange spots at the base of the caudal.

Life-colors: The colors of a male specimen in life are as follows: Body dark olive and blotched above: sides with nine dark blue-green vertical bars, the five next the last most distinct, and reaching down nearly to the anal. Spinous dorsal reddish at base, then with a broad black band, the uppermost third being of a bright ferruginous orange-red: second dorsal blackish at base, reddish above: caudal with two orange blotches at base, black mesially, pale orange externally. Anal fin of a brilliant blue-green color at base, pale at tip. Pectorals barred, the middle of the fin grass-green. Ventrals dusky mesially, with a green shade. Opercular region more or less grass-green: streaks about eye blackish-green.

Length of largest specimens taken, 2½ inches.

Habitat.—Very abundant in all the streams seined, especially so in the rocky shoals of Reedy River in the city of Greenville.

This handsome little fish may be easily known from its congeners by the smooth head, and by the general greenness of its coloration, which resembles somewhat that of the species of *Diplesium*.

Genus ETHEOSTOMA *Rafinesque.*

4. ETHEOSTOMA FLABELLARE *Raf.*

(*Catonotus flabellatus* Auct.)

Three specimens doubtfully referred to this species were obtained by Professer Cope in the Catawba River.

CENTRARCHIDÆ.

Genus MICROPTERUS *Lacépède.*

5. MICROPTERUS PALLIDUS (*Rafinesque*) *Gill & Jordan.*

Professor Cope obtained this species in the Catawba. We collected none in the Saluda or Ennoree, but we were told that "Trout", as the species of *Micropterus* are universally called in the South, are frequently taken there.

Genus CHÆNOBRYTTUS *Gill.*

6. CHÆNOBRYTTUS VIRIDIS (*Cuv. & Val.*) *Jordan.*

The War-mouth Perch occurs in abundance in the Saluda, and apparently in all the South Atlantic streams. Cope says that it is exceedingly common in all the streams of Eastern North Carolina, and that it is known as the Red-eyed Bream on the Catawba. This species is very closely related to *C. gulosus*, differing chiefly in the color and in the somewhat less robust form. It may be only a variety.

Genus LEPIOPOMUS *Rafinesque.*

7. LEPIOPOMUS AURITUS (*Linnæus*) *Raf.*

All my specimens of this species from the Saluda have a dusky blotch or bar at the base of the soft dorsal, a feature of coloration not shown by my Northern specimens. This is a widely diffused species, and, like most such, is quite variable.

Genus EUPOMOTIS *Gill & Jordan.*

8. EUPOMOTIS AUREUS (*Walbaum*) *Gill & Jordan.*

Professor Cope obtained this species in Catawba River. We have never collected it in the Southern States. It is probably chiefly confined to the lowland regions.

ESOCIDÆ.

Genus ESOX *Linnæus.*

9. ESOX RETICULATUS *Le Sueur.*

Very common. We are unable to distinguish the Southern form (*phaleratus* Say, *affinis* Holbrook) as even varietally distinct from the Northern *reticulatus.*

10. ESOX RAVENELI *Holbrook.*

Obtained by Professor Cope in the Catawba. Its specific distinction from *E. americanus* Gmelin appears questionable.

SALMONIDÆ.

Genus SALVELINUS *Richardson.*

11. SALVELINUS FONTINALIS (*Mitchill*) *Gill & Jordan.*

This species was found by Professor Cope in the headwaters of the Catawba River.

CYPRINIDÆ.

Genus CAMPOSTOMA *Agassiz.*

12. CAMPOSTOMA ANOMALUM (*Raf.*) *Ag.*

Subspecies *prolixum* (Storer) Jor.

A few specimens from Saluda River. Also in the Catawba (Cope).

Genus HYBOGNATHUS *Agassiz.*

13. HYBOGNATHUS ARGYRITIS *Girard.*

A few specimens were obtained in Saluda River, not distinguishable from others from Ohio River and others (types of *H. osmerinus* Cope) from New Jersey. Professor Cope found it abundant in Catawba River.

Genus ALBURNOPS *Girard.*

14. ALBURNOPS SALUDANUS, *sp. nov.*

Hybopsis amarus, "variety from the Catawba," COPE (1870), Proc. Am. Philos. Soc. 460.

A species belonging to "*Hybopsis*, Group A", of Cope, which is equi-

valent to the subgeneric section of *Alburnops* or "*Hybopsis*", called *Hudsonius* by Girard.

Body elongate, but compared with its immediate relatives, *hudsonius*, *amarus*, and *storerianus*, short and thick; moderately compressed, the depth 4⅔ in length: caudal peduncle shortened, 4⅔ in length: head large, 4 times in length, relatively heavy and gibbous forward, the snout rounded in profile, as in *A. hudsonius*. Eye large, rather wider than interorbital space, about equal to snout, 3¼ in head.

Mouth moderate, subinferior, the maxillary not reaching to eye.

Scales large, thin, and loose, 5–39–3, about twelve in front of the dorsal fin. Lateral line somewhat decurved in front.

Fins moderately developed. Dorsal beginning in advance of ventrals, I, 8; its first ray nearer snout than caudal. Anal I, 8, rather small. Pectorals not reaching to ventrals, the latter not to vent.

Color clear olivaceous, nearly white, like the rest of the group, some specimens showing a faint plumbeous lateral line.

Teeth 1, 4–4, 1, two or three of the principal row obtuse, not hooked; only one or two of the teeth usually showing a masticatory face.

Habitat.—Abundant in Saluda River, where it reaches a length of about four inches. Also obtained by Professor Cope from the Catawba.

The peculiar characters of this species have been noticed by Professor Cope, who, however, was disposed to consider it a variety of *H. amarus*. It differs from our specimens of what we consider to be the latter species (from Ocmulgee River) in the smaller eye, the thicker head, shorter, deeper body, more decurved front, and shorter caudal peduncle. In *amarus*, the eye is 3 in head, the head 4⅔ in length, and the caudal peduncle 3⅔.

We have been disposed to unite, under the generic name *Luxilus*, a large number of species forming a series the extremes of which bear little resemblance to each other or to the means, but which form a chain so unbroken that it is difficult to draw any generic lines among them. That this group may ultimately be broken up into natural genera is very probable, but the groups thus far proposed have not received very satisfactory definition.

These species agree (*a*) in the absence of any special modification, either of mouth, fins, or alimentary canal; (*b*) in the dentition, the teeth being in one or two rows, always *four* in the principal row of the raptorial type, and some or all of them provided with a grinding surface; often, and in some species always, one edge of the masticatory

surface is more or less crenate, especially in young individuals; (*c*) the anal fin is always short, containing from seven to nine rays; (*d*) the dorsal fin is never inserted very far behind the ventrals; (*e*) the lateral line is developed and continuous.

The species differ much among themselves in size, nuptial dress, and general appearance, notably in the squamation, the scales of the typical species of *Luxilus* being closely imbricated and much higher than long, while in the group called *Hudsonius* the two dimensions of the scales are nearly equal. The scales themselves, in *Hudsonius*, are thin and loosely imbricated. Within certain limits, the position of the dorsal varies also. In *Hudsonius*, its first ray is in advance of the insertion of the ventrals; in *Luxilus* and *Alburnops*, usually directly opposite; in *Photogenis* and *Hydrophlox*, distinctly posterior. The form of the mouth varies largely: in *L. coccogenis*, it is wide and oblique, the lower jaw projecting. In the typical species of *Alburnops* and *Hudsonius*, the mouth is small and more or less inferior.

The species may be provisionally grouped as follows, under five groups, four of which may be considered as distinct genera. Those species whose position is doubtful are indicated by a mark of interrogation:—

A.—LUXILUS *Rafinesque.* (Scales very closely imbricated, much deeper than long: teeth 2, 4–4, 2, entire: dorsal fin inserted directly opposite ventrals: mouth terminal: size large: nuptial dress peculiar; type *Cyprinus cornutus* Mit.)

cornutus Mit. — *coccogenis* Cope.
selene Jor.

B.—PHOTOGENIS *Cope.* (Scales pretty closely imbricated, deeper than long: teeth 1, 4–4, 1, more or less crenate (rarely one-rowed?): dorsal fin behind ventrals, always with a black spot on the last rays behind: males in spring tuberculate, the lower fins and the tips of the vertical fins filled with satin-white pigment in spring: mouth terminal, the upper jaw longest: size medium; type *P. spilopterus* Cope = *Cyprinella analostana*).

analostanus Girard. — *niveus* Cope.
galacturus Cope. — *iris* Cope (?).
leucopus J. & B.

C.—HYDROPHLOX *Jordan.* (Scales less closely imbricated, somewhat deeper than long; teeth usually 2, 4–4, 2, often more or less crenate: dorsal fin distinctly behind ventrals, unspotted: breeding-dress peculiar, the males almost always red: mouth terminal,

oblique, the upper jaw usually slightly the longer: size very small; type *Hybopsis rubricroceus* Cope.)

roseus Jordan.	*chrosomus* Jor.
rubricroceus Cope.	*xænocephalus* Jor.
lutipinnis J. & B.	*plumbeolus* Cope.
chiliticus Cope.	*bivittatus* Cope.
chalybæus Cope.	*lacertosus* Cope.

D.—ALBURNOPS *Girard.* (Scales rather loosely imbricated: teeth 4–4, or 1, 4–4, 1: dorsal fin inserted over ventrals, unspotted: sexes alike: mouth more or less inferior, horizontal or oblique: size small; type *Alburnops blennius* Grd.)

microstomus Raf.	*timpanogensis* Cope.
volucellus Cope.	*chlorocephalus* Cope.
spectrunculus Cope.	*fretensis* Cope.
procne Cope.	*nubilus* Forbes.
stramineus Cope.	*blennius* Grd.
tuditanus Cope (?).	*shumardi* Grd.
missuriensis Cope.	*illecebrosus* Grd.
scylla Cope.	

E.—HUDSONIUS *Girard.* (Scales thin and loosely imbricated: teeth 1, 4–4, 1 or 2, the grinding surface often distorted: dorsal inserted in advance of ventrals: colors silvery: sexes alike: mouth inferior: body elongate, the head comparatively short; size medium; type *Clupea hudsonia* Clinton.)

saludanus J. & B.	*amarus* Girard.
hudsonius Clinton.	*storerianus* Kirtland.

We have substituted the name *Alburnops* Grd. for the earlier name *Hybopsis*, as we think that the latter genus was founded on a species of *Ceratichthys*.

15. ALBURNOPS CHLOROCEPHALUS (*Cope*) *J. & B.*

Hybopsis chlorocephalus COPE (1870), Proc. Am. Philos. Soc. 461.

This beautiful little fish is abundant in the clear rapid waters of the Saluda. It resembles *H. rubricroceus*, but is smaller and stouter-bodied, with smaller mouth. The scales in front of the dorsal are fewer (about 16) in number. The teeth are 1, 4–4, 1 (2, 4–4, 2, in *rubricroceus*). The male specimens are profusely tuberculate on the snout and ante-dorsal region. Professor Cope found this species abundant in the clear waters of the tributaries of the Catawba.

Genus PHOTOGENIS *Cope.*

16. PHOTOGENIS NIVEUS (*Cope*) *J. & B.*

Hybopsis niveus COPE (1870), Proc. Am. Philos. Soc. 461.

A very pale species, related to *Photogenis analostanus* and *P. galacturus*, rather than to the species of "*Hybopsis*", to which genus Professor Cope referred it. My specimens are all very white, with a narrow bluish stripe along the caudal peduncle, which sometimes forms a faint spot at base of caudal. In male specimens, the snout and ante-dorsal region are covered with small tubercles. In males, the dorsal fin is considerably elevated. In color, the dorsal fin is largely dusky on the last rays, the most of the fin somewhat creamy-tinted. The tip of the dorsal fin and the tips of the caudal are filled with milk-white pigment, as in the related species. The anal fin is entirely milky. The teeth are 1, 4–4, 1, provided with a narrow masticatory surface.

Photogenis niveus is abundant in the Saluda River. It was first discovered by Professor Cope in the Catawba River.

17. PHOTOGENIS ANALOSTANUS (*Girard*) *Jordan.*

We did not find this species in the Saluda, although Professor Cope states that it is abundant in the Catawba. It is perhaps possible that Professor Cope mistook our *Codoma chloristia*, a species which resembles it very much, except in dentition, for the true *analostanus*. The "*Cyprinella analostana*" has been a stumbling-block in the classification of these fishes, as to the masticatory surface of *Luxilus* it adds the crenations of *Cyprinella*. We are inclined to think that *Cyprinella* should be restricted to those species whose teeth are without grinding surfaces and are permanently crenate. The relations of *Luxilus analostanus*, *spilopterus*, *galacturus*, *leucopus*, and *nireus* are much more intimately with the species of *Codoma* than with *Luxilus*, but the development of grinding surfaces on the teeth renders it necessary to refer them to the latter genus, unless *Photogenis* be admitted as a distinct genus.

Genus CODOMA *Girard.*

(Subgenus EROGALA *Jordan.*)

Photogenis JORDAN (1877), Ann. Lyc. Nat. Hist. N. Y. 335. (Not of Cope, whose type, *P. spilopterus*, proves to be a species closely related to *L. analostanus*, if not identical with it.)

Examination of a large number of specimens supposed to be *Photogenis spilopterus*, from Saint Joseph's River, in Northern Indiana, Professor

Cope's original locality, has convinced us that the *spilopterus*, the type of the genus *Photogenis*, does not belong to the group of colored species for which Professor Jordan lately adopted the latter name. The genus *Photogenis* (Jordan) being thus left without a name, that of *Erogala* has been suggested (ἦρ, spring-time; γάλα, milk, in allusion to the milk-white pigment with which the male fishes are ornamented in the nuptial season).

Codoma Grd. differs from *Erogala* in the form of the head, which is short, blunt, and rounded, as in *Pimephales*. We do not now think that the two are distinct as genera, and prefer to consider *Erogala* as a subgenus of *Codoma*.

The type of *Erogala* is *Photogenis stigmaturus* Jordan. This subgenus is remarkable for its geographical distribution. All of the species thus far known belong to the Southern States, and each of the Southern river-basins probably has from two to four species of the genus; not a single species, so far as known, being common to two different river-basins.

The distribution of the species of *Erogala* is as follows:—

Santee Basin: *pyrrhomelas* Cope.
chloristia J. & B.
Savannah Basin: none known.
Altamaha Basin: *xænura* Jor.
callisema Jor.
Chattahoochee Basin: *eurystoma* Jor.
Flint River: *formosa* Putn.
Alabama Basin: *callistia* Jor.
trichroistia J. & G.
cærulea Jor.
stigmatura Jor.

Farther west their place is taken by the species of *Cyprinella* having serrated teeth, and farther north by the species of *Luxilus*, section *Photogenis*, having teeth with developed grinding surfaces.

The species of *Codoma* are remarkable for their exquisite coloration, most of them being adorned with bright red in addition to the milky pigment. The black dorsal spot is present in all the species.

18. CODOMA CHLORISTIA, *sp. nov.*

Body short and deep, strongly compressed, the form elliptical, resembling that of *C. pyrrhomelas*, but rather deeper, the depth of adults being 3¾ to 4 in length. Head rather small and pointed, 4¼ in length.

Eye moderate, less than snout, 4 in head. Mouth rather small, quite oblique, the maxillary not attaining the line of the orbit, the upper jaw projecting beyond the lower, especially in spring males. The head and mouth considerably resemble those parts in *P. analostanus*.

Scales much deeper than long, very closely and smoothly imbricated, more or less dark-edged above. 5–37–3. Lateral line decurved.

Fins moderately developed: dorsal distinctly behind ventrals, its first ray about midway between nostrils and the base of the caudal. Dorsal 1, 8. Anal 1, 8.

Nuptial tubercles in the male greatly developed, covering rather sparsely the top of the head and the region anterior to the dorsal. In addition, similar tubercles cover the caudal peduncle and the whole sides of the body, except the space below the lateral line and in front of the ventrals. The tubercles on the body are considerably smaller than those on the head, and smaller than in *xænura* or *pyrrhomelas*, but they cover a much larger area than in any of the latter species of the genus. Chin tuberculate.

Teeth 1, 4–4, 1, entire, without masticatory surface.

Coloration, in life: General color a dark steel-blue, a very distinct blue stripe along each side of the caudal peduncle, as in *C. cærulea*, but fainter: sides of body with fine steely-purple lustre: back clear green: head clear brownish: iris white: cheeks of a pale violet color: lower part of sides becoming rather abruptly milky-white: dorsal fin with the usual large black spot on the last rays well developed, and the usual milk-white pigment in the tips: lower part of the dorsal fin with pigment of a fine clear green color, somewhat as in *analostanus*, but unusually bright: caudal fin chiefly dusky, its tips milky and the base somewhat so; the middle of the fin has a slight reddish tinge: anal fin entirely milky, a faint dusky spot on its last rays, resembling that on the dorsal: ventral fins milky.

Female and young specimens are more slender, and the bright colors are usually wanting or obscured.

Size small; length of largest specimens less than three inches.

In form, this species resembles *C. pyrrhomelas*, but the short anal (eight rays instead of ten) will always distinguish the species. The coloration of the male is different, being much less brilliant, although perhaps more delicate. *C. chloristia* resembles in color *C. cærulea* most, but the latter species has a much more slender form.

Habitat.—Abundant in the clear waters of Saluda River, with *C.*

pyrrhomelas, *Photogenis niveus*, *Alburnops chlorocephalus*, and other handsome species.

19. CODOMA PYRRHOMELAS (*Cope*) *Jor.*

Photogenis pyrrhomelas COPE (1870), Proc. Am. Philos. Soc. Phila. 463.

This species, the most ornate of the genus, and one of the most brilliant of *Cyprinidæ*, is extremely abundant in the clear rapid waters of the Saluda and its tributaries. The general color of the males is dark steel-blue above, with the scales darker-edged, the belly abruptly milky-white. The head is pale reddish; the snout, the tip of lower jaw, and the iris above and below are scarlet; the dorsal fin is dusky at base, has a large black spot on the last rays, is red in front, and broadly milk-white at tip. The tips of the caudal fin are milk-white; next to this comes a dusky crescent; a wide bright scarlet crescent lies inside of the black and extends into the two lobes of the fin. The base of the fin is pale.

The top of the head and the region in front of the dorsal are covered with small pale tubercles. The sides of the caudal peduncle are provided with rather larger tubercles, arranged in rows along the series of scales.

This is the most abundant fish in the waters of Catawba River, according to Professor Cope.

Genus NOTROPIS *Rafinesque.*

(*Minnilus* Rafinesque; *Alburnellus* Girard.)

20. NOTROPIS PHOTOGENIS (*Cope*) *Jordan.*

Squalius photogenis COPE (1864) Proc. Ac. Nat. Sc. 280.
Photogenis leucops COPE (1866), Trans. Am. Phil. Soc. 379, and elsewhere.

My specimens differ considerably from the typical forms of this species, but correspond to Professor Cope's "var. *a a a a a*" from the Catawba. It is the most abundant species in the Saluda waters, especially in more sluggish tributaries. Two forms, perhaps varieties, perhaps different sexes, occur, the one pale, with deep, compressed body; the other darker, with the scales dark-edged and the body much more elongate. It is difficult to distinguish the latter form from *N. telescopus* (Cope). The pale form has the head above and under jaw covered with small pointed tubercles.

Genus GILA *Baird & Girard.*

(Subgenus CLINOSTOMUS *Girard.*)

21. GILA VANDOISULA (*Cuv. & Val.*) *Jor.*

Leuciscus vandoisulus C. & V. (1844), Hist. Nat. Poiss. xvii, 317.
Clinostomus affinis GIRARD (1856), Proc. Ac. Nat. Sc. 212.

This species is common in the Saluda waters, as in the Catawba, Yadkin, and other Southern streams. It seems to prefer still, or even muddy waters, as we found it more abundant in the Reedy River than in either Saluda or Ennoree. Our specimens were greenish or bluish in color, the back mottled with scales of a different hue, as usual in this genus. In the males, the region behind the head and above the pectorals and extending backward to the anal are of a bright rosy-red, brightest just behind the head. There is no distinct dark lateral band. None of our specimens were noticed to be tuberculate. The characters distinguishing this species from the more northerly *Gila* (*Clinostomus*) *funduloides* have been well given by Professor Cope (Journ. Ac. Nat. Sci. Phila. 1868, 228).

Genus NOTEMIGONUS *Rafinesque.*

22. NOTEMIGONUS AMERICANUS (*Linn.*) *Jordan.*

Notemigonus ischanus JORDAN (1877), Ann. Lyc. Nat. Hist. p. 364.

This is the true *Cyprinus americanus* of Linnæus, as has been elsewhere shown. We obtained but a single specimen in the Reedy River. Professor Cope found it abundant in the sluggish waters of the Catawba. The long anal, more compressed body, larger eye, and peculiar breeding colors distinguish this species from the Northern and Western *N. chrysoleucus.*

Genus CERATICHTHYS *Baird.*

23. CERATICHTHYS ZANEMUS, *sp. nov.*

A small, peculiar species, allied to *C. labrosus* (Cope), but apparently differing in the longer barbel, smaller scales, and in the coloration.

Body long and slender, not much compressed, the depth about 4¼ (5½ in young) in length. Head rather long, narrow, and pointed, 4¼ in length, very slender in young specimens, stouter in adults: snout decurved in profile, with an angle in front of the nostrils. Eye moderate,

rather shorter than the long muzzle, placed nearly midway in head, about 3½ in head.

Mouth rather large, inferior, the lips much thickened, Sucker-like; upper jaw extremely protractile; the lower with a conspicuous internal fringe of papillæ.

Barbels extremely long, probably longer than in any other of our Cyprinoids; their length ⅔ to ¾ the diameter of the eye.

Scales moderate, pretty closely imbricated, 5–40–3; 15 or 16 in front of dorsal. Lateral line continuous, slightly deflected forward.

Fins rather small, high, and short. Dorsal 1, 8, originating slightly behind the base of the ventrals, as in *C. labrosus* and *C. monachus*. Anal 1, 7. Caudal deeply forked, its peduncle long and slender.

Coloration, in spirits, quite pale; a small, round, black spot at base of caudal: dorsal scales dark-edged: some dark points along caudal peduncle, forming a dark streak: muzzle punctate. Large specimens with a large dark patch on the last rays of dorsal, as in *C. monachus* and the species of *Codoma:* base of dorsal fin with dark points. Cheeks and opercles silvery.

In the spring, the male fishes are profusely tuberculate on the head and neck, and the fins are flushed with crimson. Teeth 1, 4–4, 1, hooked, without masticatory surface.

The largest specimens taken were nearly three inches long, but most were less than two.

This species is abundant in Saluda River. It appears to be distinct from *C. labrosus*, that species having larger scales and some other points of difference. *C. labrosus*, *monachus*, and *zanemus* differ from their congeners in the backward position of the dorsal and in the greater development of the lips.

24. CERATICHTHYS LABROSUS *Cope.*

Ceratichthys labrosus COPE (1870), Proc. Am. Philos. Soc. 458.

Professor Cope found this species not uncommon in the upper waters of the Catawba. We did not find it in the Saluda or the Enoree.

25. CERATICHTHYS HYPSINOTUS *Cope.*

Ceratichthys hypsinotus COPE (1870), Proc. Am. Philos. Soc. 458.

This species is not uncommon in the Saluda. Breeding males are violet-tinted, and the fins are quite red. The head is more or less rosy and tuberculate above. This species has a very small barbel, and might easily be taken for a *Hydrophlox* of the *rubricroceus* type.

26. CERATICHTHYS BIGUTTATUS (*Kirt.*) *Baird.*

The common Horned Chub is very abundant in all the tributaries of the Saluda.

Genus SEMOTILUS *Rafinesque.*

27. SEMOTILUS CORPORALIS (*Mit.*) *Putn.*

This common species occurs in the tributaries of the Saluda.

CATOSTOMIDÆ.

Genus MYXOSTOMA *Rafinesque.*

(*Moxostoma* and *Teretulus* Raf.; *Ptychostomus* Ag.)

28. MYXOSTOMA CERVINUM *Cope.*

Teretulus cervinus COPE (1868), Journ. Ac. Nat. Sc. Phila. 235.
Ptychostomus cervinus COPE (1870), Proc. Am. Philos. Soc. 478.

This little Sucker is exceedingly abundant in the Saluda, Reedy, and Ennoree. It abounds in rapids and rocky shoals, and is popularly known as "Jump-rocks", from its habit of leaping from the water. It is not much valued, except by negroes, small boys, and naturalists. The black outer margin of the dorsal is a characteristic color-mark.

29. MYXOSTOMA PAPILLOSUM (*Cope*) *Jor.*

Ptychostomus papillosus COPE (1870), Proc. Am. Philos. Soc. 470.

A few specimens of this peculiar species were taken in Saluda River. Professor Cope found it abundant in the Catawba and Yadkin Rivers.

30. MYXOSTOMA VELATUM (*Cope*) *Jordan.*

Ptychostomus collapsus COPE (1870), Proc. Am. Philos. Soc. 471.

We obtained no specimens of this widely diffused species in any of the Southern rivers. Professor Cope found it in the Neuse, Yadkin, and Catawba.

31. MYXOSTOMA COREGONUS (*Cope*) *J. & B.*

Ptychostomus coregonus COPE (1870), Proc. Am. Phil. Soc. 472.

The "Blue Mullet" was found very abundant in the Catawba and Yadkin Rivers. We did not take it in the Saluda.

32. MYXOSTOMA ALBUM (*Cope*) *J. & B.*

Ptychostomus albus COPE (1870), Proc. Am. Phil. Soc. 472.

The species—the "White Mullet"—was found by Professor Cope in the Catawba River only. We obtained no specimens from the Saluda, which is perhaps due to the fact that our collections were not made during the season of the migrations.

Genus ERIMYZON *Jordan.*

(*Myxostoma* Agassiz, but not of Raf.)

33. ERIMYZON SUCETTA (*Lac.*) *Jordan.*

Cyprinus sucetta LACÉPÈDE.
Cyprinus oblongus MITCHILL.

This species is moderately abundant in the Saluda River. Professor Cope found neither this species, nor the next, in the Catawba.

Genus MINYTREMA *Jordan.*

34. MINYTREMA MELANOPS (*Raf.*) *Jor.*

Catostomus melanops RAFINESQUE, KIRTLAND, etc.
Moxostoma victoriæ GIRARD.
Erimyzon melanops JORDAN.

This widely diffused species is abundant in the mill-ponds, etc., of the Saluda River, and is known as the Striped Sucker. It is considerably valued as a food-fish. Many specimens were taken at Bannister's Mills, on the Ennoree, the proprietor of the mill, Mr. Bannister, having kindly drawn off the water from his pond, in order to enable us better to examine its fishes. Our specimens seem to be precisely like the ordinary *melanops* from the Ohio River and the Great Lakes.

Genus CATOSTOMUS *Le Sueur.*

35. CATOSTOMUS COMMERSONI (*Lac.*) *Jor.*

The Fine-scaled Sucker is common in the Saluda, as in nearly every stream east of the Rocky Mountains. It is especially abundant in mill-ponds.

SILURIDÆ.

Genus AMIURUS *Rafinesque.*

36. AMIURUS BRUNNEUS *Jordan.*

Amiurus platycephalus COPE (1870), Proc. Am. Philos. Soc. 485. (Not *Pimelodus platycephalus* Grd.)
Amiurus brunneus JORDAN (1870), Ann. Lyc. Nat. Hist. 366.

This is the common cat-fish of the Saluda, and is known as the Mud Cat. Adult specimens reach a length of about 18 inches, and bear little resemblance to the young, from which the species was first described. The adults are extremely elongate, nearly terete behind, with flat, thin, broad heads. In color, they are of a more or less clear yellowish-green, more distinctly green than is any other species. The name "*brunneus*" only applies well to the young. The species may be known from the related *A. platycephalus* by the more elongate form, the shorter anal fin (16 to 18 rays instead of 20), and by the mouth, which is somewhat inferior, the lower jaw being much the shorter, while in *A. platycephalus* the jaws are equal. The color is also different in the two species. *A. platycephalus* is yellowish, dark above, and more or less marbled on the sides with darker, resembling, in that respect, *A. marmoratus*. In *A. brunneus*, the caudal fin is usually unequal, the upper lobe being the longer, and the rudimentary caudal rays are unusually numerous. A specimen nearly a foot long had the alimentary canal four times the length of the body, and filled with *Podostemon ceratophyllum*. The stomach contained eight adult males of *Codoma pyrrhomelas*.

As Professor Cope counted 17 anal rays in his "*platycephalus*", it is likely that he had this species instead of Girard's, which has pretty uniformly 20 or 21 rays. Both *Amiurus brunneus* and *platycephalus* are valued as food.

37. AMIURUS PLATYCEPHALUS (*Girard*) *Gill.*

Pimelodus platycephalus GIRARD (1859), Proc. Ac. Nat. Sci. Phila. 160.

Many specimens of this species were taken in Bannister's mill-pond, on the Ennoree. The fishermen confound it with the preceding under the name of Mud Cat, but the species may be readily distinguished by the characters given above.

A "Blue Cat" is said to occur in the Saluda, but we obtained no specimens.

Genus NOTURUS *Rafinesque.*

38. NOTURUS INSIGNIS (*Richardson*) *Gill & Jor.*

Noturus marginatus BAIRD.

This species is abundant in the rock-pools of Reedy River. It probably occurs in all the Atlantic streams as far north as Pennsylvania.

ANGUILLIDÆ.

Genus ANGUILLA *Thunberg.*

39. ANGUILLA VULGARIS *Fleming.*

The common Eel is abundant in all the streams of the Southern States thus far explored.

LEPIDOSTEIDÆ.

Genus LEPIDOSTEUS *Lacépède.*

40. LEPIDOSTEUS OSSEUS (*L.*) *Ag.*

This fish is said to occur in the Saluda, but we obtained no specimens.

II.—WATER-BASIN OF THE SAVANNAH RIVER.

Fifteen species are ascertained to occur in the water-basin of the Savannah. Of these, two species are recorded from specimens in the United States National Museum; one on the authority of Professor Agassiz, the others from our collections in the Tugaloo River and in Toccoa Creek. None of these species are peculiar to the Savannah Basin. The common *Cyprinidæ* are all of Tennessee River types; the others are either species of general distribution, or else are shared with other Southern streams.

In seining the Tugaloo River, two rather unexpected features were made manifest: first, the very small number of small fishes, both *Cyprinidæ* and *Etheostomatidæ* inhabiting the river. There seem to be very few species present, and these few are represented by very few individuals. Although the islands below the mouth of Panther Creek furnish a most excellent seining-ground, yet our fishing was a series of "water-hauls". A single draw of the seine in the Saluda or the Etowah would often yield more species and more individuals than were secured in the Tugaloo in a whole day.

The second peculiarity of the Tugaloo fauna is that its characteristic fishes are all of types abundant in the Tennessee River, but not known from any other of the Atlantic streams. Of these may be mentioned *Photogenis galacturus*, *Luxilus coccogenis*, *Hydrophlox rubricroceus*, and *Catostomus nigricans*. The close proximity of the sources of the Tugaloo and the Little Tennessee, War Woman Creek and Little Tennessee River rising on opposite sides of Rabun Gap, and of the Tallulah and the Hiawassee, may perhaps help to explain this anomaly of distribution.

ETHEOSTOMATIDÆ.

Genus HADROPTERUS *Agassiz.*

1. HADROPTERUS NIGROFASCIATUS *Ag.*

A single large specimen was taken in Toccoa Creek, near Toccoa Falls.

CENTRARCHIDÆ.

Genus MICROPTERUS *Lacépède.*

2. MICROPTERUS SALMOIDES (*Lac.*) *Gill.*

(Var. *salmoides.*)

The small-mouthed Black Bass or "Trout" of the Southern streams (*i. e.*, Savannah, Altamaha, Chattahoochee, Alabama) differs so constantly from Northern representatives of the same species that the two forms may be taken as geographical varieties of one species, and it is probably worth while to distinguish each by name. The *Labrus salmoides* of Lacépède was collected by Bosc near Charleston, S. C. It was therefore presumably the Southern variety, which should be designated as var. *salmoides*. The oldest name known to apply to the Northern form is that of *Bodianus achigan* Raf. The Northern form may therefore be designated as *Micropterus salmoides* var. *achigan*, whenever it is deemed desirable to call attention to these variations.

The body is appreciably longer and slenderer in var. *salmoides* than in var. *achigan*, the head being about 3¼ in length instead of about 2¾. The anal rays in *salmoides* are usually 10 instead of 11; the dorsal formula X, I, 12, instead of X, I, 13. The scales are larger in *salmoides*, there being about 70 in the lateral line instead of 77. The coloration of *salmoides* is uniformly unlike that of *achigan*. The lower part of the sides

is marked by pretty regular lines of dark olive-green spots along the series of scales. The lower fins are usually more or less red, and the black, yellow, and white coloration of the caudal fin, so conspicuous in young specimens of the Northern form—in the Western States, at least—is not noticeable in the Southern variety.

This species is abundant in the tributaries of the Savannah, where it is known as the "Trout".

Genus XENOTIS *Jordan.*

3. XENOTIS SANGUINOLENTUS (*Agassiz*) *Jordan.*

JORDAN (1877), Ann. Lyc. Nat. Hist. 318.

A single specimen of this beautiful fish is in the National Museum from Augusta, Ga. It is identical with my specimens from the Etowah, mentioned in the paper above cited, but it is possibly not the species to which Agassiz gave the name of *sanguinolentus*. The species of the genus *Xenotis* are extremely difficult either to define or to recognize.

CYPRINODONTIDÆ.

Genus ZYGONECTES *Agassiz.*

4. ZYGONECTES NOTTII *Agassiz.*

A "*Zygonectes guttatus*" is recorded by Professor Agassiz from the Savannah near Augusta. Professor Putnam informs me, from the examination of the type-specimens, that the species is identical with *Z. nottii* Ag.

SALMONIDÆ.

Genus SALVELINUS *Richardson.*

5. SALVELINUS FONTINALIS (*Mitch.*) *Gill & Jor.*

The common Brook Trout is very abundant in the clear tributaries of the Chatuga and Toxaway Rivers, at the foot of the Blue Ridge. This is very near the southern limit of the species, although it is said to occur in certain tributaries of the Upper Chattahoochee, farther west.

CYPRINIDÆ.

Genus LUXILUS *Rafinesque.*

6. LUXILUS COCCOGENIS (*Cope*) *Jordan.*

This beautiful species is common in the Tugaloo. The numerous specimens were all pale, and showed only traces of the distinctive red markings.

Genus PHOTOGENIS *Cope.*

7. PHOTOGENIS GALACTURUS (*Cope*) *J. & B.*

Hypsilepis galacturus COPE (1870), Proc. Ac. Nat. Sc. 160

The most abundant fish in the Tugaloo. Our specimens were very pale and dull colored, but they are not otherwise different from specimens of *P. galacturus* from the Tennessee and Cumberland Rivers.

Genus HYDROPHLOX *Jordan.*

8. HYDROPHLOX RUBRICROCEUS (*Cope*) *J. & B.*

Hybopsis rubricroceus COPE (1868), Journ. Ac. Nat. Sc. 231.

This surpassingly beautiful little fish abounds in the rock-pools of the smaller tributaries of the Tugaloo. In Toccoa Creek, it is very abundant, far outnumbering all other species. We obtained many specimens from the pool at the foot of Toccoa Falls.

The life-colors are as follows: Dark steel-blue; a dark lateral band of coaly punctulations, which is usually distinct on the anterior half of body, and passes through the eye around the snout. All the fins of a rich clear red; the dorsal rather crimson, the caudal pink, the lower fins full bright scarlet. Head all pale scarlet-red, the lower jaw flushed, as if bloody, a lustrous streak along the sides, below which is a distinct silvery lustre. Eyes silvery, somewhat flushed with red. In high coloration, the entire body becomes more or less red. This red pigment becomes more evident when a fish is first placed in alcohol. First ray of dorsal dusky on anterior edge.

Top of head and whole ante-dorsal region in males dusted with fine white tubercles.

Female specimens are pale olivaceous or silvery.

Teeth 2, 4–4, 2, with masticatory surface, the edge of which is usually crenate.

This species and the preceding were hitherto known only from the headwaters of the Tennessee River.

Genus CERATICHTHYS *Baird.*

9. CERATICHTHYS RUBRIFRONS *Jordan.*

Nocomis rubrifrons JORDAN (1877), Ann. N. Y. Lyceum Nat. Hist. 330.

A few specimens of this species were taken. They were brighter in color than the original types from the Ocmulgee. The muzzle was in the males bright red, and the fins somewhat rosy.

This species is related to *C. hypsinotus* (Cope), but has a less elevated dorsal region and longer barbels.

10. CERATICHTHYS BIGUTTATUS (*Kirtland*) *Girard.*

The "Horny Head" is abundant in all the small streams falling into the Tugaloo. It furnishes much harmless sport for the amateur anglers who yearly visit the beautiful Tallulah region.

CATOSTOMIDÆ.

Genus MYXOSTOMA *Rafinesque.*

11. MYXOSTOMA CERVINUM (*Cope*) *Jor.*

The little "Jump Rocks" occurs in some abundance in the Tugaloo and its tributaries.

Genus CATOSTOMUS *Le Sueur.*

(*Hylomyzon* Agassiz.)

12. CATOSTOMUS NIGRICANS *Le S.*

The Hog-sucker occurs in rapid waters of the Tugaloo and Toccoa. It is not known to occur in any other of the Atlantic streams south of the Potomac.

SILURIDÆ.

Genus AMIURUS *Rafinesque.*

13. AMIURUS PLATYCEPHALUS (*Girard*) *Gill.*

The original types of this species in the Smithsonian Institution were from a tributary of the Savannah at Anderson, S. C.

Genus ICHTHÆLURUS *Rafinesque.*

14. ICHTHÆLURUS PUNCTATUS (*Raf.*) *Jor.*

The common "Channel Cat" is found in some abundance in the Tugaloo River.

ANGUILLIDÆ.

Genus ANGUILLA *Thunberg.*

15. ANGUILLA VULGARIS *Fleming.*

The common Eel is an inhabitant of the waters of the Tugaloo.

III.—WATER-BASIN OF THE ALTAMAHA RIVER.

Twenty-three species are known to occur in the water-basin of the Altamaha, exclusive of the Shad (*Alosa sapidissima*), which ascends all the Southern rivers until prevented by the dams Of these twenty-three, four are known only from the Oconee and Ocmulgee, viz, *Nothonotus inscriptus*, *Hydrophlox lutipinnis*, *Codoma callisema*, and *Codoma xænura*. The others are chiefly species of general distribution. Five species were obtained by the writers in the headwaters of the Oconee River, viz, *Nothonotus inscriptus*, *Micropterus salmoides*, *Hydrophlox lutipinnis*, *Ceratichthys rubrifrons*, and *Ceratichthys biguttatus*. The other species mentioned below are from the Ocmulgee.

ETHEOSTOMATIDÆ.

Genus HADROPTERUS *Agassiz.*

1. HADROPTERUS NIGROFASCIATUS *Agassiz.*

Taken at the Flat Shoals in the South Fork of the Ocmulgee.

Genus BOLEOSOMA *DeKay.*

2. BOLEOSOMA MACULATICEPS *Cope.*

A specimen, apparently of this species, from the Ocmulgee River at Macon, Ga.

Genus NOTHONOTUS *Agassiz.*

3. NOTHONOTUS INSCRIPTUS, *sp. nov.*

Body rather stout and deep, pretty strongly compressed behind, less so anteriorly: depth 4¾ in length: caudal peduncle rather deep.

Head large, 4¾ in length, rather obtuse, the profile quite gibbous: a considerable angle formed opposite the eyes, which are high up and rather close together.

Eye about equal to snout, 3½ in head. Mouth moderate, slightly oblique, the maxillary reaching eye, the upper jaw the longer. Cheeks and opercles entirely scaleless, as in *N. thalassinus*. Region in front of dorsal scaly: breast naked. Belly covered with ordinary scales. Scales rather large, closely imbricated, the lateral line continuous and nearly straight. Scales 5–46–5.

Fins well developed. The spinous dorsal larger than the soft dorsal,

which is somewhat larger than the anal; the two dorsal fins connected by membrane. Dorsal XI–I, 11. Anal II, 8.

Dorsal spines a little more than half the length of head. Pectorals and ventrals well developed.

Color, in spirits: Olive, with an orange spot on on each scale, these forming continuous lines along the rows of scales. These lines are quite conspicuous, as in *Xenisma catenatum*. Three dark blotches across the back: one in front of dorsal, forming a black spot on the anterior dorsal spines; one between the two dorsal fins, forming a similar black spot on the last part of the spinous dorsal; and one on the caudal peduncle, behind the second dorsal.

Sides with about six irregular dark olive blotches just below the lateral line. Second dorsal, caudal, and pectoral extensively dusky-shaded. Anal unicolor. Head dusky above, a dark line downward, and one forward from eye.

A female specimen taken lacked the lines of orange spots, and it was more distinctly blotched on the sides. In life, the male specimen had the entire anal fin, the cheeks, opercles, and a bar below the eye bright blue. The extreme edge of the spinous dorsal was blackish; below this bright orange red, and a dusky bar at the base. The colored lines of spots were ferruginous, or scarlet-red, rather than orange.

Length 2½ inches.

Two specimens only were taken, in the upper waters of the Oconee River, at Sulphur Springs, in Hall County, Georgia.

This is one of the most beautiful of this interesting genus. In the smooth head, it resembles *N. thalassinus*, and differs from the others known. The entirely dissimilar coloration separates it at once from *N. thalassinus*.

CENTRARCHIDÆ.

Genus MICROPTERUS *Lacépède.*

4. MICROPTERUS SALMOIDES (*Lac.*) *Gill.*

Var. *salmoides.*

Abundant in the Oconee and Ocmulgee.

Genus CHÆNOBRYTTUS *Gill.*

5. CHÆNOBRYTTUS VIRIDIS (*C. & V.*) *Jordan.*

The "War-mouth Perch" is abundant in the Ocmulgee.

Genus LEPIOPOMUS *Rafinesque.*

6. LEPIOPOMUS AURITUS (*L.*) *Raf.*

Common in the Ocmulgee River.

Genus CENTRARCHUS *Cuvier & Valenciennes.*

7. CENTRARCHUS MACROPTERUS (*Lacépède*) *Jordan.*

Several specimens of the large-finned *Centrarchus* are in the United States National Museum, from the Ocmulgee River, near Macon, Ga. The characters distinguishing this species from *C. irideus* are given in Bulletin No. 10 of the National Museum, p. 31.

ESOCIDÆ.

Genus ESOX *Linnæus.*

8. ESOX RETICULATUS *Le Sueur.*

Found in the Ocmulgee River.

CYPRINIDÆ.

Genus ALBURNOPS *Girard.*

(Subgenus HUDSONIUS *Grd.*)

9. ALBURNOPS AMARUS (*Grd.*) *Jordan.*

Hybopsis hudsonius var. *amarus* JORDAN (1877), Ann. Lyc. Nat. Hist. N. Y. 362.

Very abundant in the South Fork of the Ocmulgee. This is possibly not Girard's *amarus*, but at present I think that it is. *Leuciscus spirlingulus* C. & V. seems to be *A. hudsonius.*

Genus HYDROPHLOX *Jordan.*

10. HYDROPHLOX LUTIPINNIS, *sp. nov.*

A brilliantly colored little fish allied to *H. rubricroceus.*

Body stout and rather strongly compressed, the depth 4¼ in length, the dorsal region somewhat elevated, the outline of the back sloping each way from the base of the dorsal fin.

Head short and rather deep, 4 to 4¼ in length, broad and flattish

above, the muzzle moderately rounded. Eye rather large, nearly as long as the muzzle, $3\frac{1}{2}$ to $3\frac{3}{4}$ in head.

Mouth large, quite oblique, the maxillary reaching to orbit, the mandible included.

Scales medium, 6–40–3, rather closely imbricated, about 21 in front of the dorsal. Dorsal nearer caudal than muzzle, distinctly behind the ventrals. Dorsal I, 8. Anal I, 8. Pectorals not reaching nearly to ventrals, the latter not to vent.

Color, in spirits: Clear olive; a dark, burnished, plumbeous lateral band, which extends through the eye and up the caudal fin: whole body bright crimson: fins yellow.

Colors, in life: Clear olive above, with very intense green dorsal and vertebral lines; an intense metallic blackish band along sides; below this the sides bright silvery, in the males bright, clear red, the color of red berries; the whole body more or less flushed with red, the belly especially bright: iris crimson.

Fins all bright golden-yellow: silvery space below eye strongly marked: tip of lower jaw black.

Teeth 2, 4–4, 2, with masticatory surface developed.

Length $2\frac{1}{2}$ to 3 inches.

This species is extremely abundant in the headwaters of the Oconee, in clear rapid streams. It is one of the most brilliant of the genus.

Hydrophlox lutipinnis is deeper-bodied than *H. rubricroceus*. It has also a smaller mouth and different coloration, especially of the fins. From *A. chlorocephalus*, it differs in the larger mouth, larger size, and smaller scales: the pectoral and ventral fins are also usually shorter. The teeth, also, are 2, 4, instead of 1, 4.

Genus CODOMA *Girard.*

11. CODOMA XÆNURA *Jordan.*

Minnilus (Photogenis) xænurus JORDAN (1877), Proc. Ac. Nat. Sc. Phila. 79.

This beautiful fish is the most abundant species in the rapids of the Ocmulgee at Flat Shoals.

12. CODOMA CALLISEMA *Jordan.*

Episema callisema JORDAN (1877), Ann. Lyc. Nat. Hist. 363.

This species, one of the most elegant of the genus, is very abundant in the South Fork of the Ocmulgee. It differs from the other species of

the genus in the presence of a single row of teeth and in the more anterior position of the dorsal, which is scarcely at all posterior to the ventrals. It is, however, rather a *Codoma* than an *Episema*.

Genus NOTEMIGONUS *Rafinesque.*

13. NOTEMIGONUS AMERICANUS (*L.*) *Jor.*

Notemigonus ischanus JORDAN (1877), Ann. Lyc. Nat. Hist. 364.

Very abundant everywhere in the Ocmulgee in still or deep waters. Adult specimens have the lower fins yellow, tipped with scarlet.

Genus CERATICHTHYS *Baird.*

14. CERATICHTHYS RUBRIFRONS *Jordan.*

Nocomis rubrifrons JORDAN (1877), Ann. Lyc. Nat. Hist. N. Y. 330.

This handsome little fish was first described from the Ocmulgee River, where it is abundant. It is also common in the Oconee.

15. CERATICHTHYS BIGUTTATUS (*Kirt.*) *Girard.*

Abundant in the Oconee; not noticed in the Ocmulgee.

Genus SEMOTILUS *Rafinesque.*

16. SEMOTILUS CORPORALIS (*Mit.*) *Putnam.*

From a small brook, tributary to the Ocmulgee. In the South, this species is almost confined to the smaller creeks and spring runs.

CATOSTOMIDÆ.

Genus MYXOSTOMA *Rafinesque.*

17. MYXOSTOMA CERVINUM (*Cope*) *Jordan.*

The little "Jump Rocks" is very abundant at the Flat Shoals of the Ocmulgee.

18. MYXOSTOMA PAPILLOSUM (*Cope*) *Jordan.*

Common in the Ocmulgee.

Genus ERIMYZON *Jordan.*

19. ERIMYZON SUCETTA (*Lac.*) *Jordan.*

From the Ocmulgee.

SILURIDÆ.

Genus ICHTHÆLURUS *Rafinesque.*

20. ICHTHÆLURUS PUNCTATUS (*Rafinesque*) *Jordan.*

Very common in the Ocmulgee.

Genus AMIURUS *Rafinesque.*

21. AMIURUS MARMORATUS (*Holbrook*) *Jordan.*

A single specimen is in the National Museum, collected by Dr. Holbrook in the Altamaha River. The species occurs in abundance in the streams and sloughs of Southern Illinois.

22. AMIURUS BRUNNEUS *Jordan.*

Very abundant in the Ocmulgee, from which river it was first described.

ANGUILLIDÆ.

Genus ANGUILLA *Thunberg.*

23. ANGUILLA VULGARIS *Fleming.*

Eels occur in all the larger tributaries of the Oconee and Ocmulgee.

IV.—WATER-BASIN OF THE CHATTAHOOCHEE RIVER.

Our collections in the Chattahoochee Basin have been rather unsatisfactory, as only twenty-one species have been obtained. Of these, three seem to be characteristic of the river, and have not yet been obtained elsewhere: *Semotilus thoreauianus*, *Photogenis lucopus*, and *Codoma eurystoma*. The other species taken are found also either in the Altamaha or Alabama, or both.

The Chattahoochee is noteworthy as being, so far as is at present known, the easternmost limit in the Southern States of the Rock Bass (*Ambloplites rupestris*) and the Red Horse (*Myxostoma duquesnii*), as the westernmost limit of the range of the "Green Cat" (*Amiurus brunneus*), the War-mouth Perch (*Chænobryttus viridis*), and the "Jump Rocks" (*Myxostoma cervinum*). It is also the westernmost of the series of rivers—Great Pedee, Santee, Savannah, Altamaha, and Chattahoochee—in which *Luxilus cornutus* does not occur.

Four of the species here mentioned were collected several years ago by Dr. Hugh M. Neisler at some point in Georgia, the record of the locality not certainly preserved, but supposed to be Flint River, and are now in the Museum of the Smithsonian Institution. These are *Campostoma anomalum*, *Semotilus thoreauianus*, *Codoma formosa* (*"grandipinnis"*), and *Aphododerus sayanus* (*"Asternotremia mesotrema"*).

ETHEOSTOMATIDÆ.

Genus HADROPTERUS *Agassiz.*

1. HADROPTERUS NIGROFASCIATUS *Agassiz.*

Abundant at the Shallow Ford of the Chattahoochee near Gainesville, Ga.

CENTRARCHIDÆ.

Genus MICROPTERUS *Lacépède.*

2. MICROPTERUS PALLIDUS (*Raf.*) *G. & J.*

Not very abundant.

3. MICROPTERUS SALMOIDES (*Lac.*) *Gill.*

Very common.

Genus AMBLOPLITES *Rafinesque.*

4. AMBLOPLITES RUPESTRIS (*Raf.*) *Gill.*

Abundant.

Genus LEPIOPOMUS *Rafinesque.*

5. LEPIOPOMUS PALLIDUS (*Mit.*) *G. & J.*

(*Ichthelis incisor* Holbrook.)

A few specimens taken in Peach Tree Creek near Atlanta.

6. LEPIOPOMUS AURITUS (*L.*) *Raf.*

Abundant at the Shallow Ford of the Chattahoochee. My specimens are more elongate than those from the Saluda, and they differ somewhat in coloration and squamation. The dark blotches at the base of the dorsal are wanting. I am not, however, disposed to consider them as specifically distinct.

APHODODERIDÆ.

Genus APHODODERUS *Le Sueur.*

7. APHODODERUS SAYANUS (*Gill*) *DeK.*

The specimen described in Bulletin No. 10, U. S. Nat. Mus., as *Asternotremia mesotrema* Jor., doubtless belongs to this species. The "genus" *Asternotremia* is probably an immature stage of *Aphododerus.*

CYPRINIDÆ.

Genus PHOTOGENIS *Cope.*

8. PHOTOGENIS LEUCOPUS, *sp. nov.*

A slender, rather plain species, closely resembling *Photogenis niveus* from the Saluda.

Body elongate, compressed, tapering toward the snout and the long caudal peduncle. Depth 4⅓ in length. Head moderate, 4½ in length, larger than in *P. niveus*, rather pointed, wide on top. Snout rather long and somewhat pointed. Mouth large, quite oblique, the intermaxillaries on the level of the pupil: upper jaw slightly longest. Eye moderate, rather less than snout, 3½ in head. Scales moderate, rather closely imbricated, but less so than in *P. analostanus*, 6–39–3.

Fins moderate, D. I, 8, A. I, 8, the dorsal evidently behind the ventrals. Pectorals not reaching nearly to ventrals, the latter not quite to vent. Neither dorsal nor anal specially elevated.

Teeth 1, 4–4, 1, hooked, with narrow grinding surfaces and usually somewhat crenate.

Color olivaceous, the sides bright silvery: a rather inconspicuous dark blotch on last rays of dorsal, as in related species. A round black spot, nearly as large as eye, at base of caudal, precisely as in *Codoma eurystoma.* In life, the coloration is pale; the dorsal fin is chiefly of a clear yellowish-green color, as though yellowish pigment were mixed with white; the upper part is of a pale ferrugineous-red and the extreme tip milky-white. The caudal fin is ferrugineous, with milk-white tips. The lower fins, especially the ventrals, are milk-white. The snout in males is tuberculate, and very minute prickles occur on the sides of the caudal peduncle. Length 3½ to 4 inches.

Very abundant in the Chattahoochee River at the Shallow Ford; not noticed elsewhere.

Compared with *P. niveus*, *P. leucopus* has a different form, the dorsal region is less elevated, and the nuchal region less depressed. The mouth is larger, the maxillary extending to nearly opposite the eye, instead of falling short. The eye is larger and the mouth is less inferior in *P. leucopus*. The coloration is somewhat different.

Photogenis leucopus also resembles *Codoma eurystoma*, but that species has a heavier head, larger eye, stouter body, and different dentition and coloration.

Genus CODOMA *Girard.*

9. CODOMA EURYSTOMA *Jordan.*

Photogenis eurystomus JORDAN (1877), Ann. Lyc. Nat. Hist. 356.

This is the most abundant Cyprinoid in the tributaries of the Chattahoochee River. It frequents especially the cold streams, but does not seem to be adverse to mud. In Suwannee Creek, a deep, cold, muddy stream flowing through the woods, this was almost the only species obtained.

Its life-colors are as follows: General color of *Luxilus cornutus* on body, but the sides with considerable coppery lustre. Dorsal fin with a sharp, black, horizontal bar about half-way up. In young fishes, this bar is red. The fin above is somewhat milky; below, it is pale. There is a small, but distinct, round, black, caudal spot. The caudal fin is chiefly of a rather dull ferruginous red. The base of the fin is pale, the tips rather milky. The anal fin is unmarked. There are gilt lines along the back and sides. A dark humeral bar is usually present, and the upper edge of the pectoral fin is largely black.

The teeth of this species are usually 1, 4–4, 1, as at first described, but we have found several individuals 1, 4–4, 2. This species resembles somewhat *Photogenis leucopus*, but it is stouter every way, with deeper body, larger head, and much larger eye.

10. CODOMA FORMOSA (*Putnam*) *Jordan.*

(*Alburnus formosus* Putnam, *Leuciscus hypselopterus* Günther, *Photogenis grandipinnis* Jordan.)

The typical specimens of *P. grandipinnis* are supposed to have been collected in Flint River. *Leuciscus hypselopterus* of Günther is doubtless the same species. We follow Günther in identifying *Alburnus formosus* Putnam as the same, although there is little in the very imperfect original description to warrant it.

Genus CAMPOSTOMA *Agassiz.*

11. CAMPOSTOMA ANOMALUM (*Raf.*) *Ag.*

Specimens in Dr. Neisler's collection, supposed to have been taken in the Flint River, in Taylor County, Georgia.

Genus SEMOTILUS *Rafinesque.*

12. SEMOTILUS THOREAUIANUS *Jordan.*

The types are in Dr. Neisler's collection, probably from Flint River.

Genus CERATICHTHYS *Baird.*

13. CERATICHTHYS BIGUTTATUS (*Kirtland*) *Girard.*

Very abundant in the Chattahoochee.

CATOSTOMIDÆ.

Genus MYXOSTOMA *Rafinesque.*

14. MYXOSTOMA DUQUESNII (*Le Sueur*) *Jordan.*

A species which we are unable to distinguish from the common "Red Horse" of the Ohio is abundant in the Chattahoochee.

15. MYXOSTOMA CERVINUM *Cope.*

A few specimens taken in the Shallow Ford.

Genus ERIMYZON *Jordan.*

16. ERIMYZON SUCETTA (*Lac.*) *Jor.*

From Peach Tree Creek near Atlanta.

SILURIDÆ.

Genus ICHTHÆLURUS *Rafinesque.*

17. ICHTHÆLURUS PUNCTATUS (*Raf.*) *Jor.*

The Channel Cat is exceedingly abundant in the Chattahoochee.

Genus AMIURUS *Rafinesque.*

18. AMIURUS BRUNNEUS *Jordan.*

This is the most abundant edible fish in the Chattahoochee. We secured upwards of forty large specimens in two hours' seining at the Shallow Ford. It grows to the length of about 18 inches, and is much valued as food. It is usually known as the Mud Cat.

Genus NOTURUS *Rafinesque.*

19. NOTURUS LEPTACANTHUS *Jordan.*

Noturus leptacanthus JORDAN (1877), Ann. Lyc. Nat. Hist. N. Y. 352.

This species was originally described from a single specimen taken in Silver Creek, a tributary of the Etowah. A second specimen, similar to the first, was taken by us at the Shallow Ford during the past summer, and since then a third, at the same locality as the first. In color, this species is of a rich pale transparent brown, very slightly mottled with darker.

LEPIDOSTEIDÆ.

Genus LEPIDOSTEUS *Lacépède.*

20. LEPIDOSTEUS OSSEUS (*L.*) *Ag.*

Taken at the Shallow Ford.

ANGUILLIDÆ.

Genus ANGUILLA *Thunberg.*

21. ANGUILLA VULGARIS *Fleming.*

Eels, of course, abound in the Chattahoochee.

V.—WATER-BASIN OF THE ALABAMA RIVER.

The fish-fauna of the Alabama River is now better known than that of any other of the Southern streams. Fifty-five species are now known as inhabitants of that river and of its great tributaries, the Etowah, Oostanaula, and Coosa. A slight examination of any suitable tributary of the Alabama is sufficient to show that it is much richer in species than are any of the rivers lying to the eastward of it.

Of these fifty-six species, thirteen are as yet only known from the

Alabama Basin. These are: *Xenisma stelliferum*, *Zygonectes guttatus*, *Zygonectes hieroglyphicus*, *Hydrophlox xænocephalus*, *Hydrophlox chrosomus*, *Codoma callistia*, *Codoma trichroistia*, *Codoma cærulea*, *Codoma stigmatura*, *Notropis stilbius*, *Phenacobius catostomus*, *Catostomus nigricans etovanus*, and *Myxostoma euryops*. I exclude from this enumeration one or two species recorded from the Black Warrior River, as it is likely that the fauna of that stream will prove, in part at least, different.

Certain common Northern or Western types, apparently absent in the streams hitherto noticed, make their appearance in the waters of the Alabama. Among these are *Luxilus cornutus*, *Notemigonus chrysoleucus*, *Chænobryttus gulosus*, *Hyodon*, *Phenacobius*, etc.

ETHEOSTOMATIDÆ.

Genus PERCINA *Haldeman.*

1. PERCINA CAPRODES (*Raf.*) *Grd.*

Abundant: precisely like Northern specimens.

Genus HADROPTERUS *Agassiz.*

2. HADROPTERUS NIGROFASCIATUS *Agassiz.*

Abundant: first described from near Mobile.

Genus ULOCENTRA *Jordan.*

3. ULOCENTRA STIGMÆA *Jordan.*

Boleosoma stigmæa JORDAN (1877), Ann. Lyc. Nat. Hist. N. Y. 311.

Common in clear water. This species also occurs in the streams of Louisiana.

Genus BOLEICHTHYS *Girard.*

4. BOLEICHTHYS ELEGANS *Girard.*

Abundant in clear, weedy ponds. This may not be identical with Girard's species, which was originally described from Texas.

PERCIDÆ.

Genus STIZOSTETHIUM *Rafinesque.*

5. STIZOSTETHIUM SALMONEUM *Rafinesque.*

In the river-channels of the Oostanaula. We have had no opportunity to examine specimens, and we are not sure that the Alabama fish is the original *salmoneum*.

CENTRARCHIDÆ.

Genus MICROPTERUS *Lacépède.*

6. MICROPTERUS PALLIDUS (*Raf.*) *G. & J.*

Abundant.

7. MICROPTERUS SALMOIDES (*Lac.*) *Gill.*
(Var. *salmoides.*)

Abundant, but less so than the preceding. The two species are known indiscriminately as "Trout".

Genus CHÆNOBRYTTUS *Gill.*

8. CHÆNOBRYTTUS GULOSUS (*C. & V.*) *Gill.*

From the Alabama River at Montgomery.

Genus AMBLOPLITES *Rafinesque.*

9. AMBLOPLITES RUPESTRIS (*Raf.*) *Gill.*

From the Etowah and Oostanaula; rather common.

Genus LEPIOPOMUS *Rafinesque.*

10. LEPIOPOMUS PALLIDUS (*Mit.*) *G. & J.*

Abundant in the Etowah and Oostanaula.

11. LEPIOPOMUS OBSCURUS (*Agassiz*) *Jor.*

Not rare in the Etowah and Oostanaula.

Genus XENOTIS *Jordan.*

12. XENOTIS INSCRIPTUS (*Agassiz*) *Jor.*

From the Oostanaula.

13. XENOTIS SANGUINOLENTUS (*Agassiz*) *Jor.*

Very abundant in the Etowah and Oostanaula.

Genus EUPOMOTIS *Gill & Jordan.*

14. EUPOMOTIS PALLIDUS (*Agassiz*) *G. & J.*

Specimens from the Alabama River near Montgomery. This species and the three preceding were first described from the Tennessee River in Alabama.

Genus CENTRARCHUS *Cuvier & Valenciennes.*

15. CENTRARCHUS IRIDEUS (*Lac.*) *C. & V.*

Specimens from Alabama River, at Montgomery, similar to others from the Neuse and from about Charleston. This species has been found by Prof. S. A. Forbes in Southern Illinois.

Genus POMOXYS *Rafinesque.*

16. POMOXYS NIGROMACULATUS (*Le S.*) *Girard.*

Specimens from the Alabama River at Montgomery.

17. POMOXYS ANNULARIS *Raf.*

From Round Lake near Montgomery.

SCIÆNIDÆ.

Genus HAPLOIDONOTUS *Rafinesque.*

18. HAPLOIDONOTUS GRUNNIENS *Rafinesque.*

Abundant in the Oostanaula.

COTTIDÆ.

Genus POTAMOCOTTUS *Gill.*

19. POTAMOCOTTUS MERIDIONALIS (*Girard*) *Gill.*

Potamocottus carolinæ GILL (1861), Proc. Bost. Soc. Nat. Hist.

Potamocottus zopherus JORDAN (1877), Ann. Lyc. Nat. Hist. N. Y. 320.

Exceedingly abundant in all the clear and cold tributaries of the Etowah, Oostanaula, and Coosa. Many specimens from the cold waters of the Cave Spring Creek. We are unable to satisfactorily distinguish the forms called *zopherus*, *carolinæ*, and *meridionalis*, and, believing them specifically identical, we unite them under the oldest name.

APHODODERIDÆ.

Genus APHODODERUS *Le Sueur.*

(*Aphredoderus* Le S.; *Sternotremia* Nelson.)

20. APHODODERUS SAYANUS (*Gilliams*) *DeKay.*

Specimens from Alabama River near Montgomery. The fish described by Professor Jordan from Flint River, under the name of *Asternotremia mesotrema*, is undoubtedly a variation of this species.

CYPRINODONTIDÆ.

Genus XENISMA *Jordan.*

21. XENISMA STELLIFERUM *Jordan.*

Xenisma stellifera JORDAN (1877), Ann. Lyc. Nat. Hist. N. Y. 322.

This most exquisitely colored fish is very abundant in all the clear tributaries of the Etowah, Oostanaula, and Coosa. It prefers cold waters, and ascends the "spring-runs" to their fountain-heads.

Genus ZYGONECTES *Agassiz.*

22. ZYGONECTES NOTTII *Agassiz.*

Many specimens in the Museum of the Academy of Natural Sciences of Philadelphia, from near Mobile. This and the next belong to the group of short-bodied species called *Micristius* by Professor Gill.

23. ZYGONECTES GUTTATUS *Agassiz.*

Recorded by Professor Agassiz from near Mobile.

24. ZYGONECTES HIEROGLYPHICUS *Agassiz.*

Recorded by Professor Agassiz from near Mobile. We have never seen either this or the preceding, and doubt if any one will ever recognize them from the published descriptions.

ESOCIDÆ.

Genus ESOX *Linnæus.*

25. ESOX RETICULATUS *Le Sueur.*

Abundant in tributaries of the Etowah.

26. ESOX RAVENELI *Holbrook.*

A few specimens in the United States National Museum from the Alabama River.

HYODONTIDÆ.

Genus HYODON *Le Sueur.*

27. HYODON SELENOPS *Jordan & Bean.*

Hyodon selenops JORDAN & BEAN (1877), Bulletin U. S. Nat. Mus. x. 65.

A single specimen in the National Museum from the Alabama River at Montgomery.

DOROSOMATIDÆ.

Genus DOROSOMA *Rafinesque.*

28. DOROSOMA CEPEDIANUM (*Lac.*) *Gill.*

(Var. *heterurum* Raf.)

Specimens in the United States National Museum from Round Lake at Montgomery, Ala.

CYPRINIDÆ.

Genus CAMPOSTOMA *Agassiz.*

29. CAMPOSTOMA ANOMALUM (*Raf.*) *Ag.*

Var. *prolixum* (Storer).

Abundant in the Etowah and Oostanaula.

Genus LUXILUS *Rafinesque.*

30. LUXILUS CORNUTUS (*Mit.*) *Jor.*

Very abundant in all the tributaries of the Etowah, Oostanaula, and Coosa Rivers.

My specimens do not obviously differ from those from New York and the Northwest.

Genus HYDROPHLOX *Jordan.*

31. HYDROPHLOX CHROSOMUS *Jordan.*

Hybopsis chrosomus JORDAN (1877), Ann. Lyc. Nat. Hist. N. Y. 333.

Very abundant in the clear tributaries of the Oostanaula, Coosa, and Etowah. In Cedar Creek, at Cave Spring, it is the commonest species occurring in the clear, cold waters, with *Codoma callistia* and *Xenisma stelliferum*. None of our *Cyprinidæ* excel *Hydrophlox chrosomus* in delicacy of coloration. It is of a clear hyaline-green above; clear silvery below: a scarlet band straight from upper edge of opercle to caudal: dorsal, anal, and caudal each with a scarlet bar. In this species, the mouth is rather less terminal than is usual in the group called *Hydrophlox*.

32. HYDROPHLOX XÆNOCEPHALUS *Jordan.*

Hybopsis xænocephalus JORDAN (1877), Ann. Lyc. Nat. Hist. 334.

With the preceding, but rather less common. This species bears some resemblance to the young of *Codoma callistia*.

Genus CODOMA *Girard.*

33. CODOMA STIGMATURA *Jordan.*

Photogenis stigmaturus JORDAN (1877), Ann. Lyc. Nat. Hist. N. Y. 337.

This elegant species is very abundant in the tributaries of the Etowah, Oostanaula, and Coosa. In those streams which are neither very clear and cold nor very muddy, it is usually the most abundant species.

34. CODOMA CALLISTIA *Jordan.*

Photogenis callistius JORDAN (1877), Ann. Lyc. Nat. Hist. N. Y. 337.

A large, ornate species, more brilliantly colored than the preceding, but less graceful in form. Female specimens are dull dark olive, with the dorsal fin brick-red. This species occurs with the preceding, but is rather less abundant.

35. CODOMA TRICHROISTIA *Jordan & Gilbert, sp. nov.*

A small, slender species, graceful in form and elegant in coloration. It is most nearly related to *C. callistia*, but may be readily distinguished.

Body rather slender, considerably compressed, the depth 4½ in length. Head rather slender and pointed, 4⅓ in length. Eye of moderate size, 3⅓ in head. Mouth quite large, very oblique, the maxillary extending to opposite the anterior margin of the eye, and the premaxillaries being on a level with the middle of the pupil, the mouth thus being similar to that of the species of *Notropis*. In *C. callistia*, the mouth is much more inferior, nearly horizontal; the maxillaries do not extend to the eye, and the *premaxillaries are entirely below the level of the orbit.*

Scales rather closely imbricated, 6–42–3; lateral line considerably decurved, usually with an abrupt angulation between pectorals and ventrals; 18 or 19 scales before dorsal fin (15 or 16 in *C. callistia*).

Fins moderately developed: dorsal well behind ventrals, rather nearer caudal than muzzle. Dorsal I, 7. Anal I, 9. Pectorals falling somewhat short of ventrals; the latter reaching beyond vent nearly to base of anal.

Color: Bright steel-blue above: sides bright silvery; in males, more or less milky. A large black spot at base of caudal, precisely as in *C. callistia*, not nearly so distinct as in *C. stigmatura*. Head silvery; above bluish. Dorsal fin with a broad, dusky, horizontal band at base; the membrane of the last rays above jet-black, blacker than in the other species; the tip of the fin milk-white. The rest of the dorsal fin espe-

cially the anterior part, is of a bright pale vermillion-red. The caudal fin is chiefly rosy, the tips milk-white. The anal is milky, with a decided flush of rose-color. The ventrals are milky.

Female specimens are duller, but the black fin-markings and the caudal spot are similar in all. In the female of *C. callistia*, the dorsal markings are obliterated.

In the males, in spring, the head and anterior dorsal region are rather sparsely tuberculate. The caudal peduncle and the space below the lateral line as far forward as the ventrals are covered with similar tubercles.

Teeth 1, 4–4, 1, of the usual type, hooked and sharp-edged. Maximum length 2¾ inches. *C. callistia* reaches a length of 4 inches.

Codoma trichroistia is very abundant in the clear tributaries of the Etowah and Oostanaula. Specimens were taken by Messrs. Jordan and Gilbert in 1876, but the species was at first confounded by us with *C. callistia*, which it much resembles in coloration. The entirely different mouth will distinguish the two species at once.

36. EROGALA CÆRULEA *Jordan.*

Photogenis cæruleus JORDAN (1877), Ann. Lyc. Nat. Hist. N. Y. 338.

This most delicate and graceful fish has thus far been only found in the Oostanaula River and its tributary, Rocky Creek. It prefers clear waters.

37. CODOMA FORMOSA (*Putnam*) *Jordan.*

The typical specimens of *Alburnus formosus* Putnam and of *Leuciscus hypselopterus* Günther were obtained from near Mobile. The species therefore belongs to the fauna of the Alabama Basin. Günther's description applies well to "*Photogenis grandipinnis* Jor.", and *Alburnus formosus* is probably the same.

The following is an analysis of the characters of the species of the subgenus *Erogala* at present known:—

Section I. Anal fin elongate, its rays I, 10, or I, 11: teeth 1, 4–4, 1.

a. Dorsal fin entirely posterior to ventrals, its rays, in males, longer than head, reaching nearly to the base of the caudal: body short, much compressed: back elevated; depth 4 in length: head 4¼: mouth large, very oblique, the jaws equal: black dorsal blotch very distinct: a distinct black caudal spot: coloration and tubercles unknown: size small; length 2¼ inches. ..... FORMOSA, 1.

aa. Dorsal fin slightly posterior to ventrals, its longest rays, in males, shorter than the head, and not reaching nearly to base of caudal: caudal peduncle tuberculate: fins with much red: size medium; length 3¼ inches.

b. Body deep, compressed; depth 3¼ to 3⅔ in length: fins all greatly elevated; the height of the dorsal five-sixths the length of the head: muzzle, anterior part of dorsal fin, and a broad crescent in the middle of the caudal fin bright scarlet: posterior margin of caudal blackish; no black spot at base of caudal..... PYRRHOMELAS, 2.

bb. Body more elongate, less compressed, its depth 4 to 4¼ in length: fins all rather low, the longest dorsal ray scarcely ⅔ length of head: dorsal, anal, and caudal fins chiefly bright crimson: no definite dark margin to caudal: a faint black caudal spot ..... XÆNURA, 3.

Section II. Anal fin short, its rays I, 8, or I, 9.

* Teeth one-rowed, 4–4. Dorsal fin scarcely at all posterior to ventrals, its first ray nearer snout than base of caudal: body elongate, compressed: mouth smallish, oblique, rather inferior: dorsal fin greatly elevated, the longest ray, in males, longer than the head: black dorsal blotch well marked: dorsal, anal, and caudal fins chiefly of a bright ferruginous-orange; a blue streak along sides: size small; length 2⅔ inches... CALLISEMA, 4.

** Teeth two-rowed, 1, 4–4, 1 (often 1, 4–4, 2, in *C. eurystoma*).

c. Black markings of the dorsal fin not in the form of a horizontal bar across the fin.

d. Adult males without red markings on the fins.

e. No distinct black or dark blue spot at base of caudal: body short and deep, strongly compressed: fins not greatly elevated, the dorsal largely of a bright lustrous pale green: black dorsal markings distinct: a bluish streak along sides: males with the whole body tuberculate, except the space anterior to the ventrals and below the lateral line: head pointed: mouth oblique, the upper jaw projecting: size small; length 3 inches ..... CHLORISTIA, 5.

ee. A rather faint dark blue caudal spot, preceded by a very distinct lateral band of clear blue: sides chiefly blue and silvery: fins clear yellow, the black markings obscure: body slender: mouth small: fins not greatly elevated: size small; length 2⅔ inches ..... CÆRULEA, 6.

eee. A large, very conspicuous jet-black spot at base of caudal: body elongate, moderately compressed: color pale olivaceous or bluish: sides silvery: fin-markings rather obscure: fins rather low: mouth oblique, the lower jaw the shorter: scales large; size large: length 4 inches.. STIGMATURA, 7.

dd. Adult males with the vertical fins chiefly red: a well-marked black caudal spot, less distinct than in *C. stigmatura.*

f. Mouth large, quite oblique, the jaws about equal, the maxillary reaching to opposite the eye *and the premaxillaries anteriorly* on the level of the pupil: body slender, compressed: dorsal fin dusky at base, jet-black on last rays, the fin otherwise, as well as the anal and caudal pale vermillion: caudal peduncle tuberculate: dorsal markings usually distinct in both sexes: size small; length 2⅔ inches ..... TRICHROISTIA, 8.

ff. Mouth nearly horizontal, overlapped by the heavy snout, the maxillary not reaching to the eye, and the *premaxillaries anteriorly* below the level of the orbit: dorsal fin dusky at the base and on the last rays, the greater part of the fin, as well as of the caudal, bright carmine: coloration of body quite dark, blue in males, olive in females: dorsal markings obscure in the latter: body stout, not greatly compressed, the back somewhat elevated: size large; length 4 inches ..... CALLISTIA, 9.

cc. Black markings of the dorsal fin in the form of a horizontal bar across the fin midway: body stout and deep, not greatly compressed: head heavy: mouth large, oblique, with equal jaws: eye very large; a small but distinct black caudal spot: fins with pale red: teeth sometimes 1, 4–4, 2: size large; length 4 inches: appearance of *Luxilus*..... EURYSTOMA, 10.

Genus NOTROPIS *Rafinesque.*

38. NOTROPIS LIRUS *Jordan.*

Notropis lirus JORDAN (1877), Ann. Lyc. Nat. Hist. N. Y. 342.

Common in tributaries of the Etowah, Oostanaula, and Coosa in still, deep waters. This species is not, by any means, a typical member of the genus. In form, coloration, squamation, and nuptial tubercles, it resembles the species of *Lythrurus*, from which it is technically separated by the want of masticatory surface on the teeth. *Notropis matutinus* approaches it in the small size of its scales.

39. NOTROPIS STILBIUS *Jordan.*

Notropis stilbius JORDAN (1877), Ann. Lyc. Nat. Hist. N. Y. 343.

Abundant in the water-basin of the Alabama. The species of this genus greatly need revision.

Genus NOTEMIGONUS *Rafinesque.*

40. NOTEMIGONUS CHRYSOLEUCUS (*Mit.*) *Jor.*

(*Stilbe americana* of most writers; not *Cyprinus americanus* Linnæus, which is a Southeastern species—*Notemigonus ischanus* Jor.)

This familiar species is very abundant in bayous and weedy streams in the basin of the Alabama.

Genus PHENACOBIUS *Cope.*

41. PHENACOBIUS CATOSTOMUS *Jordan.*

Phenacobius catostomus JORDAN (1877), Ann. Lyc. Nat. Hist. N. Y. 332.

This strongly marked species was found in abundance in two clear streams, Silver Creek and Cedar Creek, tributaries respectively to the Etowah and the Coosa. This is a much stouter species than *P. uranops* Cope; it has less developed lips and is in various other ways dissimilar.

Genus CERATICHTHYS *Baird.*

42. CERATICHTHYS WINCHELLI (*Girard*) *Jordan.*

Hybopsis winchelli GIRARD (1856), Proc. Ac. Nat. Sc. Phila. 1856, 211.
Ceratichthys hyalinus COPE (1868), Journ. Ac. Nat. Sc. Phila. 1868, 236.

Very common in the Alabama Basin. *C. biguttatus* was not obtained by us in any of the tributaries of the Alabama. It seems, however, to have been described by Girard, from the Black Warrior, under the name of *Nocomis bellicus.*

Genus SEMOTILUS *Rafinesque.*

43. SEMOTILUS CORPORALIS (*Mit.*) *Putnam.*

Common in the smaller streams.

Genus RHINICHTHYS *Agassiz.*

44. RHINICHTHYS OBTUSUS *Agassiz.*

Very common in the spring-runs tributary to the Etowah and Oostanaula.

CATOSTOMIDÆ.

Genus MYXOSTOMA *Rafinesque.*

45. MYXOSTOMA MACROLEPIDOTUM DUQUESNII (*Le S.*) *Jordan.*

The "Red Horse" is common in the Etowah and Oostanaula. Var. *lachrymale* (Cope) also occurs.

46. MYXOSTOMA EURYOPS *Jordan.*

Myxostoma euryops JORDAN (1877), Ann. Lyc. Nat. Hist. N. Y. 348.

From Lovejoy's Creek, a tributary of the Oostanaula. The type-specimen of this singular species still remains unique.

Genus CATOSTOMUS *Le Sueur.*

47. CATOSTOMUS NIGRICANS ETOWANUS *Jordan.*

Catostomus nigricans var. *etowanus* JORDAN (1877), Ann. Lyc. Nat. Hist. N. Y.

The Hog Mullet, or Crawl-a-bottom, is very abundant in all rapid streams in the Alabama Basin. The characters separating var. *etowanus* from *nigricans* seem to be pretty constant. I do not, however, think them distinct species.

Genus ERIMYZON *Jordan.*

48. ERIMYZON SUCETTA (*Lac.*) *Jordan.*

This species, known locally as the May Sucker, is abundant in the water-basin of the Alabama.

Genus MINYTREMA *Jordan.*

49. MINYTREMA MELANOPS *Jordan.*

The "Sand Sucker" is abundant in the waters of the Alabama.

Genus CARPIODES *Rafinesque.*

50. CARPIODES CYPRINUS (*Le S.*) *Ag.*

A single specimen from Round Lake near Montgomery, Ala., apparently identical with Pennsylvania examples.

Genus BUBALICHTHYS *Agassiz.*

51. BUBALICHTHYS (TAURUS) *Agassiz.*

Recorded by Professor Agassiz from the Alabama. Other species of "Buffalo Fish" doubtless occur in the Alabama, but the species have never been studied.

SILURIDÆ.

Genus ICHTHÆLURUS *Rafinesque.*

52. ICHTHÆLURUS PUNCTATUS (*Raf.*) *Jor.*

Abundant in the basin of the Alabama.

Genus AMIURUS *Rafinesque.*

53. AMIURUS NATALIS ANTONIENSIS (*Grd.*) *Jor.*

Abundant in muddy tributaries of the Etowah and Coosa.

Genus NOTURUS *Rafinesque.*

54. NOTURUS LEPTACANTHUS *Jordan.*

Two specimens, taken in Silver Creek, and a third specimen, from the Chattahoochee, are all that are at present known of this curious little species.

ANGUILLIDÆ.

Genus ANGUILLA *Thunberg.*

55. ANGUILLA VULGARIS *Fleming.*

Abundant.

LEPIDOSTEIDÆ.

Genus LEPIDOSTEUS *Lacépède.*

56. LEPIDOSTEUS OSSEUS (*L.*) *Ag.*

From the Oostanaula; probably common.

VI.—WATER-BASIN OF THE TENNESSEE RIVER.

The fish-fauna of the Tennessee River has been pretty fully studied, especially as to its *Cyprinidæ*. Thirty-seven species were obtained by Professor Cope in the French Broad, thirty-four in the Holston, and twenty-five by Professor Jordan in tributaries of the Clinch and French Broad, making in all some sixty different species known to inhabit the upper waters of the Tennessee. In the lower course of the river, thirty-four species are recorded by Professor Agassiz from the Tennessee River at Huntsville, Ala.; twenty species were obtained by the writers from the Chickamauga River at Ringgold, Ga., and seventeen species from Elk River at Estill Springs in Tennessee. About sixty-eight species are therefore known to occur in the lower course of the river. In all, eighty-two different species are *known* to inhabit the waters of the Tennessee. To this number many species of large fishes inhabiting the Ohio at the mouth of the Tennessee might, with certainty, be added; but it is not the province of this paper to record guesses. Forty-six species are therefore *certainly* common to the upper and lower courses of the Tennessee River.

The species at present known in the Tennessee Basin, only from the upper course,—the Clinch, Holston, and French Broad Rivers,—are the following:—

Hadropterus aurantiacus.
Diplesium simoterum.
Nothonotus zonalis.
Nothonotus vulneratus.
Nothonotus rufilineatus.
Etheostoma flabellare.
Salvelinus fontinalis.
Alburnops spectruuculus.
Hydrophlox rubricroceus.
Hydrophlox lacertosus.
Episema leucioda.
Notropis micropteryx.
Notropis atherinoides.
Hemitremia vittata.
Placopharynx carinatus.
Noturus eleutherus.

In all, sixteen species.

From the lower course of the river only, the following are known:—

("Etheostoma") cinerea.
("Etheostoma") tessellata.
Pœcilichthys jessiæ.
Chænobryttus gulosus.
Lepiopomus obscurus.
(Lepiopomus) bombifrons.
Eupomotis pallidus.
Xenotis inscriptus.
Esox (crassus).
Hyodon selenops.
Pomolobus chrysochloris.
Dorosoma cepedianum heterurum.
Notropis lirus.
Phoxinus flammeus.

Gila estor.
Quassilabia lacera.
Carpiodes bison.
Bubalichthys urus.
Amia calva.
Acipenser maculosus.

In all, twenty species.

Increased knowledge will considerably modify these lists. It is probable that the sixteen species in the first list, with the probable exceptions of *Noturus eleutherus* and *Salvelinus fontinalis*, will be found to inhabit the lower part of the river-basin, if sought for in suitable localities. It is likely that the tributaries of the Tennessee having their source in the Cumberland Mountains in Alabama have the same fish-fauna as similar streams rising in the Cumberland Mountains in Virginia.

About twelve species are at present known only from the Tennessee River and its tributaries. These are:—

Hadropterus aurantiacus.
(Etheostoma) cinerea.
(Etheostoma) tessellata.
Nothonotus vulneratus.
Nothonotus rufilineatus.
Pœcilichthys jessiæ.
(Lepiopomus) bombifrons.
Alburnops spectrunculus.
Hydrophlox lacertosus.
Phoxinus flammeus.
Episema leucioda.
Ceratichthys monachus.

As we go from the Alabama to the Tennessee, we note an increased resemblance in the fish-fauna to that of the Ohio and Upper Mississippi region. The following are some of the Northern or Western types added:—

Diplesium, *Etheostoma*, *Pœcilichthys*, *Labidesthes*, *Zygonectes* (proper), *Episema*, *Hemitremia*, *Chrosomus*, *Phoxinus*, *Placopharynx*, *Quassilabia*.

COTTIDÆ.

Genus POTAMOCOTTUS *Gill.*

1. POTAMOCOTTUS MERIDIONALIS (*Girard*) *Gill.*

From Chickamauga River. Also a single specimen from the Cave Spring at Cumberland Gap. Abundant in the French Broad River (*Cope*) and in the Holston.

ETHEOSTOMATIDÆ.

Genus PERCINA *Haldeman.*

2. PERCINA CAPRODES (*Raf.*) *Grd.*

Generally abundant in clear streams.

Genus ALVORDIUS *Girard.*

3. ALVORDIUS MACULATUS *Girard.*

(? *Alvordius maculatus* Grd.; *Hadropterus maculatus* Grd.; *Etheostoma blennioides* Agassiz, etc.; *Alvordius aspro* Cope & Jor.)

From the Clinch and French Broad Rivers. Also abundant in the Chickamauga at Ringgold.

Genus HADROPTERUS *Agassiz.*

4. HADROPTERUS AURANTIACUS (*Cope*) *Jordan.*

French Broad River (*Cope*).

Genus DIPLESIUM *Rafinesque.*

5. DIPLESIUM BLENNIOIDES (*Raf.*) *Jor.*

Holston and French Broad Rivers. Also from Chickamauga River. Described by Professor Agassiz from Huntsville, Alabama, under the name of *Hyostoma newmani.*

6. DIPLESIUM SIMOTERUM (*Cope*) *Copeland.*

From the Clinch and Holston Rivers.

Genus BOLEOSOMA *DeKay.*

7. BOLEOSOMA MACULATUM *Agassiz.*

(*B. brevipinne* Cope.)

Abundant in the Holston River.

Genus NOTHONOTUS *Agassiz.*

8. NOTHONOTUS ZONALIS (*Cope*) *Jordan.*

Holston and French Broad Rivers (*Cope*).

9. NOTHONOTUS VULNERATUS (*Cope*) *Jor.*

French Broad River at Warm Springs.

10. NOTHONOTUS RUFILINEATUS (*Cope*) *Jor.*

French Broad River. We have not examined this species and the preceding. One or both of them may perhaps belong to *Pœcilichthys.*

Genus PŒCILICHTHYS *Agassiz.*

11. PŒCILICHTHYS JESSIÆ *Jor. & Brayt.*

Jordan, Man. Vert. E. U. S. ed. 2d, 1878, 227.

Body fusiform, rather deep and compressed, the depth 5 to 5½ in length, the form of the body similar to that of *P. spectabilis.*

Head rather large, moderately pointed, 4 in length. Mouth rather large, terminal, the upper jaw slightly longest, not protractile. Eye pretty large, high up, 3½ in head, about equal to snout.

Cheeks naked, scaly above: opercles scaly: throat naked: neck above scaly: scales medium, 6–45 to 50–7. Lateral line incomplete, but extending farther than in *P. variatus* and *P. spectabilis*, on about 35 scales, or nearly to the end of the second dorsal.

Fins moderate. Dorsal, XII—about 12. Anal II, 9.

Color, in spirits, olivaceous, with about nine squarish, bar-like blotches along the sides, and about five dark cross-blotches on the back. Dorsal and caudal fins faintly barred.

In life, the fish is chestnut-colored above, and the squares on the sides are bright dark blue: the fins are mottled with chestnut. A dark yellow or orange band across the dorsal. Second dorsal and anal with dark and golden specklings.

Several specimens, each about two inches long, taken in Chickamauga River at Ringgold. The specimens are certainly not fully grown, and the coloration of the adult male is doubtless much more brilliant. It will be at once distinguished from *P. variatus* and *P. spectabilis* by the scaliness of the upper part of the cheeks, by the greater development of the lateral line, the more numerous dorsal spines, and the coloration. This species is named for Mrs. Jessie D. Brayton.

Genus ETHEOSTOMA *Rafinesque.*

12. ETHEOSTOMA FLABELLARE *Rafinesque.*

Abundant in the upper waters of the Tennessee in clear rapid streams.

Genus ? ———.

13. (ETHEOSTOMA) CINEREA *Storer.*

Described from Florence, Ala. The description has reference chiefly to the coloration. Neither this species nor the next have been recognized by any author subsequent to their description.

14. (ETHEOSTOMA) TESSELLATA *Storer.*

From the Tennessee River at Florence, Ala.

PERCIDÆ.

Genus STIZOSTETHIUM *Rafinesque.*

15. STIZOSTETHIUM VITREUM (*Cuv. & Val.*) *Jor. & Copel.*

Found by Professor Cope in the French Broad.

16. STIZOSTETHIUM SALMONEUM *Raf.*

Species of this genus occur throughout the Tennessee Basin. Professor Cope ascribes this species and the preceding to the French Broad. As we have seen no specimen, we follow his identifications.

CENTRARCHIDÆ.

Genus MICROPTERUS *Lacépède.*

17. MICROPTERUS PALLIDUS (*Raf.*) *Gill & Jordan.*

Not uncommon in the Tennessee Basin.

18. MICROPTERUS SALMOIDES (*Lac.*) *Gill.*

Very common in the Tennessee River.

Genus AMBLOPLITES *Rafinesque.*

19. AMBLOPLITES RUPESTRIS (*Raf.*) *Gill.*

Common in the Tennessee Basin.

Genus CHÆNOBRYTTUS *Gill.*

20. CHÆNOBRYTTUS GULOSUS (*C. & V.*) *Gill.*

Lower Tennessee River; probably common.

Genus LEPIOPOMUS *Rafinesque.*

21. LEPIOPOMUS PALLIDUS (*Mitch.*) *Gill & Jor.*

Very common in the Tennessee Basin.

22. LEPIOPOMUS OBSCURUS (*Agassiz*) *Jordan.*

Described by Professor Agassiz from Huntsville, Ala.

23. (LEPIOPOMUS) BOMBIFRONS (*Agassiz*).

Only the type-specimens of this species are yet known. They were

from Huntsville, Ala. We are unable to decide, from the description and a MS. drawing kindly forwarded by Professor Bliss, whether this species is a *Lepiopomus* or a *Xenotis*.

Genus XENOTIS *Jordan.*

24. XENOTIS SANGUINOLENTUS (*Agassiz*) *Jordan.*

Originally described from the Tennessee River at Huntsville. We have seen no specimens from that locality, and are unable to decide whether Agassiz's species is the one to which we have applied the name *sanguinolentus*, or whether it be one of the forms of the Northern *X. megalotis*.

25. XENOTIS INSCRIPTUS (*Agassiz*) *Jor.*

Originally described from the Tennessee River at Huntsville. Also found by Professor Cope in the upper waters of the same river.

Genus EUPOMOTIS *Gill & Jordan.*

26. EUPOMOTIS PALLIDUS (*Agassiz*) *G. & J.*

Originally described from Huntsville, Ala.

Genus XYSTROPLITES *Jordan.*

27. XYSTROPLITES NOTATUS (*Agassiz*).

Originally described from Huntsville, and later found by Professor Cope in the upper waters of the Tennessee. This species may be a *Eupomotis* instead of a *Xystroplites*. It much resembles the Texan *Xystroplites heros* B. & C.

SCIÆNIDÆ.

Genus HAPLOIDONOTUS *Rafinesque.*

28. HAPLOIDONOTUS GRUNNIENS *Raf.*

Abundant in the Tennessee Basin. The form called by Professor Agassiz *Amblodon concinnus* needs re-examination before it can be admitted as a species.

ATHERINIDÆ.

Genus LABIDESTHES *Cope.*

29. LABIDESTHES SICCULUS *Cope.*

Found by Professor Cope in Coal Creek, a tributary of the Clinch River.

CYPRINODONTIDÆ.

Genus XENISMA *Jordan.*

30. XENISMA CATENATUM (*Storer*) *Jordan.*

Originally described from Florence, Ala. It is abundant in the Elk, Clinch, and Holston in clear waters.

Genus ZYGONECTES *Agassiz.*

31. ZYGONECTES NOTATUS (*Raf.*) *Jor.*

Described by Dr. Storer from Florence, Ala., under the name of *Pœcilia olivacea.* This species prefers still, deep waters.

ESOCIDÆ.

Genus ESOX *Linnæus.*

32. ESOX (CRASSUS *Agassiz*).

A species is recorded by Professor Agassiz under the name of *Esox crassus.* The description is insufficient and the species is at present unrecognized.

HYODONTIDÆ.

Genus HYODON *Le Sueur.*

33. HYODON SELENOPS *Jordan & Bean.*

The original type of this species came from the Tennessee River at Chattanooga. *Hyodon tergisus* doubtless also occurs in the lower course of the river.

CLUPEIDÆ.

Genus POMOLOBUS *Rafinesque.*

34. POMOLOBUS CHRYSOCHLORIS *Raf.*

Abundant in the channel of the Lower Tennessee.

DOROSOMATIDÆ.

Genus DOROSOMA *Rafinesque.*

35. DOROSOMA CEPEDIANUM HETERURUM (*Raf.*) *Jor.*

The "Gizzard Shad" is abundant in the Lower Tennessee.

SALMONIDÆ.

Genus SALVELINUS *Richardson.*

36. SALVELINUS FONTINALIS (*Mitchill*) *Gill & Jor.*

This species occurs in abundance in Swannanoa River, at the foot of Black Mountain, and in all clear tributaries of the French Broad in Western North Carolina. In Southwestern Virginia, it occurs in certain tributaries of the Holston. In Rabun County, in Northeastern Georgia, it abounds in the headwaters of the Little Tennessee. Professor Cope states, on the authority of Dr. Hardy, of Asheville, that it "occurs in the headwaters of the Chattahoochee, on the south slope of the Alleghanies, in Georgia".

CYPRINIDÆ.

Genus CAMPOSTOMA *Agassiz.*

37. CAMPOSTOMA ANOMALUM (*Raf.*) *Ag.*

Var. *prolixum* Storer.

Everywhere abundant. In the clear pools of the Swannanoa River, at the foot of Black Mountain, this fish is extremely abundant, and the large specimens are brilliantly colored, so that they appear to be luminous or phosphorescent as one looks down on them through the crystal water.

Genus HYBORHYNCHUS *Agassiz.*

38. HYBORHYNCHUS NOTATUS (*Raf.*) *Agassiz.*

Numerous specimens from the Chickamauga River. These are narrower-headed than the common Western form (*H. superciliosus* Cope) and want the barbel, which is usually distinct on the latter. It is not improbable that we have two distinct species.

Genus LUXILUS *Rafinesque.*

39. LUXILUS CORNUTUS (*Mitch.*) *Jor.*

Abundant in every stream examined.

40. LUXILUS COCCOGENIS (*Cope*) *Jor.*

Abundant in every stream examined.

Genus PHOTOGENIS *Cope.*

41. PHOTOGENIS GALACTURUS (*Cope*) *Jor.*

Abundant in every stream examined.

Genus HYDROPHLOX *Jordan.*

42. HYDROPHLOX RUBRICROCEUS (*Cope*) *Jor.*

Described by Professor Cope from tributaries of the Holston. It prefers boisterous mountain-streams.

43. HYDROPHLOX LACERTOSUS (*Cope*) *Jor.*

Described from the Holston.

Genus ALBURNOPS *Girard.*

44. ALBURNOPS MICROSTOMUS (*Raf.*) *Jor.*

Minnilus microstomus RAF.
Hybopsis longiceps COPE.

Obtained by Professor Cope in tributaries of Clinch River.

45. ALBURNOPS SPECTRUNCULUS (*Cope*) *Jor.*

Obtained by Professor Cope in the Holston and French Broad.

Genus EPISEMA *Cope & Jordan.*

46. EPISEMA LEUCIODA *Cope.*

Found by Professor Cope in the Holston and French Broad.

Genus NOTROPIS *Rafinesque.*

(*Notropis et Minnilus* Raf.; *Alburnellus* Girard.)

47. NOTROPIS ATHERINOIDES *Raf.*

From tributaries of Clinch River.

48. NOTROPIS MICROPTERYX (*Cope*) *Jor.*

From tributaries of the Holston and Clinch.

49. NOTROPIS PHOTOGENIS (*Cope*) *Jor.*

(*Squalius photogenis* Cope; *Photogenis leucops* Cope.)

Abundant in the French Broad River.

50. NOTROPIS TELESCOPUS (*Cope*) *Jor.*

Holston and French Broad Rivers (*Cope*). Also abundant in Elk River. If our specimens are correctly identified, this is a true *Notropis*. We find it not easily distinguishable from *N. photogenis*.

51. NOTROPIS LIRUS *Jordan.*

This little species abounds in both the Elk and the Chickamauga.

Genus HEMITREMIA *Cope.*

52. HEMITREMIA VITTATA *Cope.*

Described from the Holston River near Knoxville.

Genus CHROSOMUS *Rafinesque.*

53. CHROSOMUS ERYTHROGASTER *Raf.*

Recorded by Professor Agassiz from Huntsville, Ala. We have seen no specimens from the Tennessee River.

Genus PHOXINUS *Rafinesque.*

54. PHOXINUS FLAMMEUS *Jordan & Gilbert.*

Jordan, Man. Vert. E. U. S. ed. 2d, p. 303.

A very distinct species, resembling "*Gila*" *margarita* (Cope), but with the short lateral line of *P. neogæus* Cope.

Body stout, rather more slender and more compressed than in *P. neogæus*, the form being nearly that of *G. margarita*. Depth 4 in length, about equal to the length of the head.

Head short and deep, smaller than in *neogæus*, the upper outline rounded, the muzzle quite blunt and rather short. Eye rather large, 3¼ in head, longer than snout. Mouth small, oblique, the lower jaw projecting, the intermaxillary in front on the level of the pupil, and the maxillary extending to opposite the front of the orbit.

Scales much larger than in *P. neogæus*, but still quite small, in appear-

ance similar to those of the species of *Gila;* dorsal and ventral regions scaled; 7–43–5. Lateral line short, decurved, not reaching to base of ventrals, on only 14 scales.

Teeth 2, 4–5, 2, as in *P. neogæus*, without masticatory surface.

Fins small: dorsal well behind ventrals: pectorals reaching nearly to ventrals, the latter to vent. D. I, 8, A. I, 8; the latter fin rather high.

Coloration that of the species of *Clinostomus*, especially *C. margarita* (which species, having the lateral line wanting on the last three to eight scales, might perhaps with propriety be referred to *Phoxinus*).

Back dark, the scales profusely punctate: a dusky band formed of dark specks along the sides: cheeks pearly: space below lateral line silvery; in the type-specimen flushed with rich scarlet-red.

Length of type 2½ inches.

A single specimen taken in Elk River, at Estill Springs, in company with *Gila estor*, which species it much resembles in color. *Phoxinus flammeus* bears the same relation to *P. neogæus* that *Gila estor* does to the small-scaled *Gila elongata.*

Genus GILA *Baird & Girard.*

(Subgenus CLINOSTOMUS *Girard.*)

55. GILA ESTOR *Jordan & Brayton.*

Jordan, Man. Vert. ed. 2d, p. 300.

A large and handsome species, related to *G. elongata* and *G. proriger*, but well distinguished from both.

Body elliptical-elongate, rather deep and compressed; the caudal peduncle long. Greatest depth 4¼ in length. Head very long and large, 3⅜ in length; flattish above, but not wide. Mouth exceedingly large, very oblique, the premaxillaries anteriorly on the level of the pupil, the maxillary extending to opposite the middle of the orbit, and the length of the gape of the mouth a little more than half the length of the head. Lower jaw decidedly the longer.

Eye quite large, less than snout, 4 in head.

Scales small, but large for the genus, their outlines well defined, especially above, 8–50–5. Lateral line strongly decurved; about 23 scales on the back anterior to the dorsal fin.

Fins high. Dorsal I, 8, well behind ventrals, its first ray nearer the caudal than the snout. Anal I, 8, short and high. Pectorals falling just short of ventrals, the latter just short of vent.

Teeth 2, 4–5, 2.

Color dark olive above, with a bluish lustre, many scales darker, as is usual in this genus. Sides somewhat silvery. No dark lateral band. A broad shade of deep rose color along the sides, below which most of the belly is bright crimson, the red colors brightest anteriorly.

Length of largest specimens about 4 inches. Numerous specimens from the Elk River at Estill Springs, and from Stone River at Murfreesboro'. This striking species resembles most *G. elongata* and *G. proriger*. Both those species have much smaller scales (70 to 75 in the lateral line in *elongata*, 60 to 65 in *proriger*). The coloration is likewise different, the two latter species having a dusky band along the sides, the anterior half of which in *elongata* is red in spring. *G. elongata* is much more elongate, as is also *G. proriger*. The mouth appears largest in *G. estor*. The distinction between *G. proriger* and *G. elongata* is perhaps questionable.

Genus NOTEMIGONUS *Rafinesque.*

56. NOTEMIGONUS CHRYSOLEUCUS (*Mit.*) *Jor.*

Common in still waters in the Tennessee Basin.

Genus PHENACOBIUS *Cope.*

57. PHENACOBIUS URANOPS *Cope.*

Rather common in the Elk and Chickamauga Rivers. A few specimens from the French Broad. Originally described from the Holston in Virginia.

Genus RHINICHTHYS *Agassiz.*

58. RHINICHTHYS OBTUSUS *Agassiz.*

(*Rhinichthys lunatus* Cope.)

This species is abundant in all clear rocky brooks and in outlets of springs.

Genus CERATICHTHYS *Baird.*

59. CERATICHTHYS MONACHUS *Cope.*

Abundant in Chickamauga River. Originally described from the Holston.

60. CERATICHTHYS DISSIMILIS (*Kirt.*) *Cope.*

Obtained in Elk River.

61. CERATICHTHYS WINCHELLI (*Girard*) *Jordan.*

(*Ceratichthys hyalinus* Cope.)

Everywhere abundant in Tennessee River. This is probably *Hybopsis gracilis* Ag., the original type of the genus *Hybopsis.* In that case, it will be necessary to substitute the specific name *gracilis* for *winchelli.*

62. CERATICHTHYS BIGUTTATUS (*Kirtland*) *Girard.*

Everywhere very abundant.

Genus SEMOTILUS *Rafinesque.*

63. SEMOTILUS CORPORALIS (*Mit.*) *Putn.*

Tributaries of the Clinch and French Broad; chiefly in small mountain-streams.

CATOSTOMIDÆ.

Genus QUASSILABIA *Jordan & Brayton.*

64. QUASSILABIA LACERA *Jordan & Brayton.*

Lagochila lacera JORDAN & BRAYTON (1877), Proc. Ac. Nat. Sc. Phila.

Two specimens of this singular fish were taken in the Chickamauga River at Ringgold and one specimen in Elk River at Estill Springs. In the Chickamauga, we were told that it is quite common, and that it is much valued for food. It is usually known as the "Hare-lip" or "Split-mouth Sucker". We have lately received a fine specimen taken in the Scioto River, Ohio, by Mr. J. H. Klippart, where it is well known to the fishermen under the name of "May Sucker".

Genus MYXOSTOMA *Rafinesque.*

65. MYXOSTOMA VELATUM (*Cope*) *Jor.*

(*Ptychostomus collapsus* Cope.)

Obtained by Professor Cope in Clinch River, and by us in the Chickamauga.

66. MYXOSTOMA MACROLEPIDOTUM DUQUESNII (*Le S.*) *Jor.*

From the Holston, Clinch, French Broad, and Chickamauga. Probably generally abundant.

Genus PLACOPHARYNX *Cope.*

67. PLACOPHARYNX CARINATUS *Cope.*

This large species is the common "Red Horse" of the French Broad. It much resembles the preceding, but has a much larger mouth and lips, besides the different dentition.

Genus ERIMYZON *Jordan.*

68. ERIMYZON SUCETTA (*Lac.*) *Jor.*

Obtained in Clinch River.

Genus MINYTREMA *Jordan.*

69. MINYTREMA MELANOPS (*Raf.*) *Jor.*

Obtained by Professor Agassiz at Huntsville, Ala.

Genus CATOSTOMUS *Le Sueur.*

70. CATOSTOMUS NIGRICANS *Le S.*

Very abundant throughout the Tennessee Basin.

71. CATOSTOMUS COMMERSONI (*Lac.*) *Jor.*

Generally abundant.

Genus CARPIODES *Rafinesque.*

72. CARPIODES BISON *Agassiz.*

Lower Tennessee River (*Cope.*) The *Bubalichthyinæ* of the Tennessee River are as yet unstudied.

Genus BUBALICHTHYS *Agassiz.*

73. BUBALICHTHYS URUS *Agassiz.*

Recorded by Professor Agassiz from the Tennessee River.

SILURIDÆ.

Genus ICHTHÆLURUS *Rafinesque.*

74. ICHTHÆLURUS PUNCTATUS (*Raf.*) *Jor.*

Very abundant in the Tennessee River.

Genus AMIURUS *Rafinesque.*

75. AMIURUS NATALIS (*Le S.*) *Gill.*

Var. *cupreus* (*Raf.*).

Rather abundant in Tennessee River. Other species of this genus are doubtless common; but they have not been distinguished.

Genus PELODICHTHYS *Rafinesque.*

76. PELODICHTHYS OLIVARIS (*Raf.*) *Gill & Jor.*

Abundant in the channels of the larger streams. Several specimens from the French Broad.

This species probably occurs in the channels of all the streams mentioned in this paper; but, from its habits, it is not easily taken with a small net.

Genus NOTURUS *Rafinesque.*

77. NOTURUS ELEUTHERUS *Jordan.*

Noturus eleutherus JORDAN (1877), Ann. Lyc. Nat. Hist. N. Y. 372.

The type-specimen of this species was from Big Pigeon River, in Cocke County, Tennessee, near its junction with the French Broad. Many other specimens have since been obtained in Tar River, North Carolina.

ANGUILLIDÆ.

Genus ANGUILLA *Thunberg.*

78. ANGUILLA VULGARIS *Fleming.*

Eels occur in Tennessee River, though rather less abundantly than in the streams farther south.

AMIIDÆ.

Genus AMIA *Linnæus.*

79. AMIA CALVA *L.*

Recorded by Professor Agassiz from Huntsville, Ala.

LEPIDOSTEIDÆ.

Genus LEPIDOSTEUS *Lacépède.*

80. LEPIDOSTEUS OSSEUS (*L.*) *Ag.*

Generally abundant.

81. LEPIDOSTEUS PLATYSTOMUS *Raf.*

From Huntsville, Ala. (*Agassiz*).

ACIPENSERIDÆ.

Genus ACIPENSER *Agassiz.*

82. ACIPENSER MACULOSUS *Le Sueur.*

Huntsville, Ala. (*Agassiz*).

83. ACIPENSER RUBICUNDUS *Le Sueur.*

From Huntsville, Ala. (*Agassiz*).

POLYODONTIDÆ.

Genus POLYODON *Lacépède.*

84. POLYODON FOLIUM "*Lac.*"

Abundant in the river-channels.

VII.—WATER-BASIN OF CUMBERLAND RIVER.

Sixty-five species are known to occur in the waters of the Cumberland River. Of these, forty-seven have been obtained in the lower course of the river, *i. e.*, in the vicinity of Nashville, by Professor Winchell, and in Stone River, at Murfreesboro', by the present writers. In the upper course of the stream, thirty-three species have been obtained by Professor Cope in the South Fork of the Cumberland in Tennessee and by Professor Jordan at the Falls and in the Rock Castle, Round Stone, Big Laurel, and other tributaries in Kentucky. Only fifteen species are, therefore, *known* to be common to both the upper and lower courses of the stream. The actual differences between the upper and lower faunæ are, however, probably very small, if similar streams are compared. The differences really existing are probably chiefly due to the fact that the large fishes inhabiting the lower part of the river are unable to ascend above the falls of the Cumberland.

Comparing the Cumberland River with the Tennessee, the disappear-

ance of one or two Southern types will be noticed, as will be the appearance of certain forms abundant in the basin of the Ohio. Of these latter may be noticed *Pœcilichthys variatus*, *Apomotis*, *Lythrurus*, and *Pimephales*. But two species, both Darters, are at present known only from the Cumberland River. These are *Ulocentra atripinnis* and *Nothonotus sanguifluus*.

The National Museum is indebted to the kindness of Professor Winchell for the following interesting—

List of Fishes of Nashville, as given by a Fisherman, Daniel A. Birchett, to A. Winchell.

"PERCH TRIBE."

Sun Perch.
Coon Perch.
White Perch.
Black Perch.
Red Perch.
Speckled Perch.
Brama Perch.
Bass or Rock Bass.

"TROUT TRIBE."

White Trout.
Black Trout.

"SUCKER TRIBE."

White Sucker.
Spotted Sucker.
Hog Sucker.
Red Horse, creeks and river.
Black Horse.
Carp, creeks and river.
Mullet.

"BUFFALO TRIBE."

White Buffalo.
Blue Buffalo.

"CAT TRIBE."

Yellow Cat.
Blue Cat.
Nigger-lip Cat.
Chisel-head Cat.
Kerkin Cat.
Shovel-bill Cat.

"MINNOW TRIBE."

Silver Side.
Stone Toter.
Horny Head.
White Roach.
Creek Mullet.
Steel Back.

MISCELLANEOUS.

Thunder Head.
Drum.
Jack.
Chover.
White Chover.
Gizzard Shad.
Skip Jack.
Tooth Herring.
Sand Pike.
Pike.
Top Water (several species).
Gar.
Sturgeon.
Eel.
Lamprey Eel.

COTTIDÆ.

Genus POTAMOCOTTUS *Gill.*

1. POTAMOCOTTUS MERIDIONALIS (*Grd.*) *Gill.*

From Cumberland River at Nashville.

ETHEOSTOMATIDÆ.

Genus PERCINA *Haldeman.*

2. PERCINA CAPRODES (*Raf.*) *Grd.*

Abundant.

Genus ALVORDIUS *Girard.*

3. ALVORDIUS MACULATUS (*Girard*) *Cope & Jordan.*

From the Rock Castle and Cumberland at various points.

4. ALVORDIUS PHOXOCEPHALUS (*Nelson*) *Cope & Jordan.*

From the Cumberland River at Nashville. Specimens of this interesting species are in the National Museum from Marais du Cygne, Kansas. I have others from the Wabash River. Nelson's types were from Illinois River.

Genus DIPLESIUM *Rafinesque.*

5. DIPLESIUM BLENNIOIDES (*Raf.*) *Jor.*

South Fork of the Cumberland River (*Cope*). Also from Cumberland and Stone Rivers.

6. DIPLESIUM SIMOTERUM (*Cope*) *Copeland.*

From the Rock Castle River at Livingston, Ky.

Genus ULOCENTRA *Jordan.*

7. ULOCENTRA ATRIPINNIS *Jordan.*

Arlina atripinnis JORDAN (1877), Bulletin X, U. S. Nat. Museum, 10.

The type of this species was collected in the Cumberland River at Nashville by Professor Winchell.

Genus NOTHONOTUS *Agassiz.*

8. NOTHONOTUS CAMURUS (*Cope*) *Jor.*

Professor Cope's types were from the South Fork of the Cumberland. We have seen others from White River in Indiana, and from Mahoning River and other streams in Ohio. This species is not identical with *Nothonotus maculatus* Ag. (*Etheostoma maculata* Kirt.), as has been supposed.

Nothonotus maculatus has a pointed instead of rounded snout; its jaws are equal; its mouth is larger, the body is more compressed, and its dorsal fin more elevated, the soft rays when depressed reaching to the caudal.

Specimens in the National Museum, collected in Mahoning River by Professors Baird and Kirtland, show the following characters:—

Body moderately elongated, very deep, strongly compressed, the depth $4\frac{2}{3}$ in length. Head 4 in length, the jaws equal, the mouth large. Eye $4\frac{1}{3}$ in head. Spinous dorsal with a long base, larger than soft dorsal, the spines high, the two fins slightly connected. Soft dorsal elevated, the longest rays when depressed reaching base of caudal, the caudal peduncle very short and deep. Caudal fin short and rounded. Anal somewhat smaller than second dorsal. Pectorals and ventrals moderate.

Scales not large, 58 to 60 in the lateral line, which is continuous: cheeks naked: opercles scaly.

Fin-rays: Dorsal XII–13; A. II, 8.

An elaborate colored drawing of a male fish in life colors, in the Smithsonian Institution, shows the following features of coloration. As we have never seen this species in life, we cannot vouch for their accuracy:—

Back olive; belly becoming yellowish. Sides and back profusely speckled with carmine-red, the blotches rather less than the size of the eye, not round, nor arranged in rows.

Dorsal fin with a dull red stripe at base, a brown interval, then a bright red stripe, finally margined with white. Second dorsal dull brown at base, then a broad red stripe; a broad marginal band of white. Caudal similarly tricolor, chiefly crimson, with a broad dusky band at base and a wide white band at the tip. Anal chiefly crimson, with a terminal band of white. Pectorals and ventrals nearly plain. Head olivaceous.

9. NOTHONOTUS SANGUIFLUUS (*Cope*) *Jor.*

From the South Fork of the Cumberland in Tennessee (*Cope*).

Genus BOLEOSOMA *DeKay.*

10. BOLEOSOMA MACULATUM *Ag.*

From the Rock Castle River.

Genus PŒCILICHTHYS *Agassiz.*

11. PŒCILICHTHYS VARIATUS (*Kirt.*) *Ag.*

From the South Fork of the Cumberland River (*Cope*).

Genus ETHEOSTOMA *Rafinesque.*

12. ETHEOSTOMA FLABELLARE *Raf.*

Abundant in the mountain tributaries of the Cumberland.

PERCIDÆ.

Genus STIZOSTETHIUM *Rafinesque.*

13. STIZOSTETHIUM SALMONEUM *Raf.*

One or two small specimens from the Rock Castle River.

CENTRARCHIDÆ.

Genus MICROPTERUS *Lacépède.*

14. MICROPTERUS PALLIDUS (*Raf.*) *G. & J.*

The "White Trout", as this species is often called, is common in the Cumberland. It is said that this species and the next were not found above the falls until introduced.

15. MICROPTERUS SALMOIDES (*Lac.*) *Gill.*

The "Black Trout" occurs with the preceding, and is still more abundant.

Genus AMBLOPLITES *Rafinesque.*

16. AMBLOPLITES RUPESTRIS (*Raf.*) *Gill.*

Everywhere abundant.

Genus APOMOTIS *Rafinesque.*

17. APOMOTIS CYANELLUS (*Raf.*) *Jor.*

Abundant in the Cumberland River at Nashville.

Genus LEPIOPOMUS *Rafinesque.*

18. LEPIOPOMUS PALLIDUS (*Mit.*) *Gill & Jordan.*

Very abundant in the Cumberland.

19. LEPIOPOMUS OBSCURUS (*Agassiz*) *Jor.*

Collected by Professor Winchell in the Cumberland River at Nashville.

Genus XENOTIS *Jordan.*

20. XENOTIS MEGALOTIS (*Raf.*) *Jor.*

Abundant in the Cumberland River.

Genus POMOXYS *Rafinesque.*

21. POMOXYS NIGROMACULATUS (*Le S.*) *Grd.*

Collected by Professor Winchell at Nashville.

22. POMOXYS ANNULARIS *Raf.*

From the Cumberland at Nashville.

SCIÆNIDÆ.

Genus HAPLOIDONOTUS *Rafinesque.*

23. HAPLOIDONOTUS GRUNNIENS *Raf.*

Abundant in the river-channel.

ATHERINIDÆ.

Genus LABIDESTHES *Cope.*

24. LABIDESTHES SICCULUS *Cope.*

Abundant in Stone River at Murfreesboro'. This interesting species was named by Rafinesque in 1832 *Zonargyra virescens.* This latter name was, however, not accompanied by a description, and therefore cannot be employed.

CYPRINODONTIDÆ.

Genus XENISMA *Jordan.*

25. XENISMA CATENATUM (*Storer*) *Jordan.*

Collected by Professor Winchell in streams about Nashville

Genus ZYGONECTES *Agassiz.*

26. ZYGONECTES NOTATUS (*Raf.*) *Jor.*

From Cumberland and Stone Rivers. Rafinesque's original specimens were from the Cumberland at Williamsburg.

HYODONTIDÆ.

Genus HYODON *Le Sueur.*

27. HYODON TERGISUS *Le Sueur.*

Abundant in the Cumberland.

28. HYODON SELENOPS *Jordan & Bean.*

Two or three specimens in the National Museum from Cumberland River.

CLUPEIDÆ.

Genus POMOLOBUS *Rafinesque.*

29. POMOLOBUS CHRYSOCHLORIS *Rafinesque.*

Abundant in the Lower Cumberland.

DOROSOMATIDÆ.

Genus DOROSOMA *Rafinesque.*

30. DOROSOMA CEPEDIANUM HETERURUM (*Raf.*) *Jor.*

Abundant in the Lower Cumberland.

CYPRINIDÆ.

Genus CAMPOSTOMA *Agassiz.*

31. CAMPOSTOMA ANOMALUM (*Raf.*) *Ag.*

Abundant.

Genus PIMEPHALES *Rafinesque.*

32. PIMEPHALES PROMELAS *Rafinesque.*

Collected by Professor Winchell in tributaries of the Cumberl

Genus HYBORHYNCHUS *Agassiz.*

33. HYBORHYNCHUS NOTATUS (*Raf.*) *Ag.*

Abundant everywhere in the Cumberland.

Genus LUXILUS *Rafinesque.*

34. LUXILUS CORNUTUS (*Mit.*) *Jordan.*

Exceedingly abundant everywhere.

Genus PHOTOGENIS *Cope.*

35. PHOTOGENIS GALACTURUS (*Cope*) *Jor.*

Very abundant everywhere in the Cumberland. Some specimei Nashville have the caudal fin pale red. This species does not s occur in the Ohio. The quotations from that river were foun erroneous identifications.

36. PHOTOGENIS ANALOSTANUS (*Grd.*) *Jor.*

From the Cumberland at Nashville.

Genus ALBURNOPS *Girard.*

37. ALBURNOPS MICROSTOMUS (*Raf.*) *Jor.*

From the South Fork of the Cumberland (*Cope*).

Genus LYTHRURUS *Jordan.*

38. LYTHRURUS ARDENS (*Cope*) *Jor.*

Very abundant everywhere in Cumberland River. One of th charcteristic species, as it apparently does not occur either in th tucky or the Tennessee.

Genus NOTROPIS *Rafinesque.*

39. NOTROPIS ATHERINOIDES (*Raf.*) *Jor.*

Very abundant in the Rock Castle and other upper tributaries Cumberland.

40. NOTROPIS MICROPTERYX (*Cope*) *Jor.*

Abundant in the Rock Castle.

41. NOTROPIS TELESCOPUS (*Cope*) *Jor.*

Stone River at Murfreesboro'.

Genus HEMITREMIA *Cope.*

42. HEMITREMIA VITTATA *Cope.*

Abundant in Big Laurel River in Laurel County, Kentucky.

Genus GILA *Baird & Girard.*

43. GILA ESTOR *Jordan & Brayton.*

Several specimens from Stone River at Murfreesboro'.

Genus CHROSOMUS *Agassiz.*

44. CHROSOMUS ERYTHROGASTER *Ag.*

From the tributaries of the Rock Castle.

Genus NOTEMIGONUS *Rafinesque*

45. NOTEMIGONUS CHRYSOLEUCUS (*Mit.*) *Jor.*

Common in sluggish waters.

Genus PHENACOBIUS *Cope.*

46. PHENACOBIUS URANOPS *Cope.*

Taken in Rock Castle River.

Genus CERATICHTHYS *Baird.*

47. CERATICHTHYS DISSIMILIS (*Kirtland*) *Cope.*

From Cumberland River at Nashville.

48. CERATICHTHYS AMBLOPS (*Raf.*) *Grd.*

From Cumberland River at Nashville.

49. CERATICHTHYS BIGUTTATUS (*Kirt.*) *Grd.*

Everywhere abundant.

Genus SEMOTILUS *Rafinesque.*

50. SEMOTILUS CORPORALIS (*Mit.*) *Put.*

From Rock Castle River.

CATOSTOMIDÆ.

Genus MYXOSTOMA *Rafinesque.*

51. MYXOSTOMA MACROLEPIDOTUM DUQUESNII (*Le S.*) *Jor.*

Common in the Cumberland.

Genus ERIMYZON *Jordan.*

52. ERIMYZON SUCETTA (*Lac.*) *Jor.*

From the Cumberland at Nashville and from the Rock Castle.

Genus MINYTREMA *Jordan.*

53. MINYTREMA MELANOPS (*Raf.*) *Jor.*

From the Cumberland at Nashville.

Genus CATOSTOMUS *Le Sueur.*

54. CATOSTOMUS NIGRICANS *Le S.*

Common in the Cumberland.

55. CATOSTOMUS COMMERSONI (*Lac.*) *Jor.*

Very common in the Cumberland.

Genus CYCLEPTUS *Rafinesque.*

56. CYCLEPTUS ELONGATUS (*Le S.*) *Ag.*

From the Cumberland at Nashville. This species is known as "Bla Horse", "Gourd-seed Sucker", and "Missouri Sucker".

Genus CARPIODES *Rafinesque.*

57. CARPIODES CUTISANSERINUS *Cope.*

From the Cumberland River at Nashville.

SILURIDÆ.

Genus ICHTHÆLURUS *Rafinesque.*

58. ICHTHÆLURUS PUNCTATUS (*Raf.*) *Jor.*

Very abundant.

Genus AMIURUS *Rafinesque.*

59. AMIURUS NATALIS (*Le S.*) *Gill.*

Collected at Nashville by Professor Winchell.

60. AMIURUS NIGRICANS (*Le S.*) *Gill*

From the Falls of the Cumberland.

Genus PELODICHTHYS *Rafinesque.*

61. PELODICHTHYS OLIVARIS (*Raf.*) *Gill & Jor.*

From the Rock Castle at Livingston, and from the Cumberland below the Falls.

ANGUILLIDÆ.

Genus ANGUILLA *Thunberg.*

62. ANGUILLA VULGARIS *Fleming.*

Common in the Cumberland. A very large specimen taken in the Rock Castle at the mouth of Round Stone River.

LEPIDOSTEIDÆ.

Genus LEPIDOSTEUS *Lacépède.*

63. LEPIDOSTEUS OSSEUS (*L.*) *Ag.*

From the Cumberland at Nashville.

POLYODONTIDÆ.

Genus POLYODON *Lacépède.*

64. POLYODON FOLIUM "*Lac.*"

From the Cumberland River.

RECAPITULATION.

The following table shows the distribution of the species in the seven river-basins especially treated in this paper. For purposes of comparison, I have introduced the results of Professor Cope's explorations in the Roanoke, James, Neuse, and Great Pedee, of Prof. Forbes and Mr. Nelson in the Illinois, and of myself and others in the Ohio. A few unverified species have been introduced, but all doubtful quotations and, in general, all "guesswork" have been excluded.

Table showing the Distribution of the Species in the Different River-Basins.

	James.	Roanoke.	Neuse.	Great Pedee.	Santee.	Savannah.	Altamaha.	Chattahoochee	Alabama.	Tennessee.	Cumberland.	Ohio.	Illinois.	General range.
Lota lacustris, (Walb.) Gill												+	+	N.
Potamocottus meridionalis, (Grd.) Gill	+								+	+	+	+		
Potamocottus hairdii, (Grd.) Gill												+	+	N.
Pleurolepis asprellus, Jor.*									+				+	
Pleurolepis ellucidus, (Baird) Ag												+		
Ioa vitrea, (Cope) Jor			+											
Percina caprodes, (Raf.) Grd									+	+	+	+	+	NE.
Percina manitou, Jor												+		NW.
Alvordius maculatus, Grd	+									+	+	+	+	
Alvordius macrocephalus, Cope												+		
Alvordius phoxocephalus, (Nels.) C. & J											+	+	+	W.
Alvordius crassus, J. & B			+		+									
Alvordius nevisensis, Cope			+											
Ericosma ovides, J. & C												+		
Rheocrypta copelandi, Jor												+		
Hadropterus aurantiacus, (Cope) Jor										+				
Hadropterus nigrofasciatus, Ag						+	+	+	+					
Hadropterus tessellatus, Jor												+		
Imostoma shumardii, (Grd.) Jor												+	+	SW.
Ulocentra atripinnis, Jor											+			
Ulocentra stigmæa, Jor									+					SW.
Diplesium blennioides, (Raf.) Jor	+									+	+	+		NW.
Diplesium simoterum, (Cope) Copel										+	+			
Boleosoma maculaticeps, Cope			+	+	+		+							
Boleosoma olmstedi, (Stor.) Ag	+									+				NE.
Boleosoma maculatum, Ag										+	+	+	+	NW.
Boleosoma æsopus, Cope												+		
Nothonotus zonalis, (Cope) Jor										+		+		
Nothonotus maculatus, (Kirt.) Ag												+		
Nothonotus camurus, (Cope) Jor											+	+		
Nothonotus sanguillnus, (Cope) Jor											+			
Nothonotus vulneratus, (Cope) Jor										+				
Nothonotus thalassinus, J. & B					+									
Nothonotus inscriptus, J. & B							+							
Nothonotus rufilineatus, (Cope) Jor										+				
Pœcilichthys variatus, (Kirt.) Ag											+	+	+	NW.
Pœcilichthys spectabilis, Ag												+	+	NW.

*Just received from Montgomery, Ala

Table showing the Distribution of the Species in the Different River-Basins—Continued.

	James.	Roanoke.	Neuse.	Great Pedee.	Santee.	Savannah.	Altamaha.	Chattahoochee.	Alabama.	Tennessee.	Cumberland.	Ohio.	Illinois.	General range.
Pœcilichthys jessiæ, J. & B.	..	..	..	..	..	..	..	..	..	+	..	..	..	
(Etheostoma) tessellata, Stor.	..	..	..	..	..	..	..	..	..	+	..	..	..	
(Etheostoma) cinerea, Stor.	..	..	..	..	..	..	..	..	..	+	..	..	..	
Etheostoma squamiceps, Jor.	..	..	..	..	..	..	..	..	..	..	..	+	..	
Etheostoma flabellare, Raf	+	+	..	..	+	..	..	..	..	+	+	+	..	
Etheostoma lineolatum, (Ag.) Jor.	..	..	..	..	..	..	..	..	..	..	..	..	+	N.
Boleichthys eos, Jor. & Copel.	..	..	..	..	..	..	..	..	..	..	..	+	+	N.
Boleichthys elegans, Grd.	..	..	..	..	..	..	..	..	+	..	..	..	+	SW.
Vaillantia camura, (Forbes) Jor.	..	..	..	..	..	..	..	..	..	..	..	..	+	
Microperca punctulata, Putn.	..	..	..	..	..	..	..	..	..	..	..	+	+	N.
Perca americana, Schranck	..	..	+	..	..	..	..	..	..	..	..	..	+	NE.
Stizostethium vitreum, (Mit.) J. & C.	..	..	..	..	..	..	..	..	..	+	..	..	+	NE.
Stizostethium salmoneum, Raf.	..	..	..	..	..	..	..	..	+	+	+	+	+	
Stizostethium canadense, (Smith) Jor	..	..	..	..	..	..	..	..	..	..	..	+	+	N.
Roccus chrysops, (Raf.) Gill	..	..	..	..	..	..	..	..	..	..	..	+	+	N.
Morone interrupta, Gil.	..	..	..	..	..	..	..	..	..	..	..	+	+	SW.
Micropterus pallidus, (Raf.) G. & J.	+	..	+	+	+	..	..	+	+	+	+	+	+	
Micropterus salmoides, (Lac.) Gill ..	..	..	..	..	..	+	+	+	+	+	+	+	+	
Acanthurchus pomotis, (Baird) Gill.	..	..	+	..	..	..	..	..	..	..	..	..	..	
Ambloplites rupestris, (Raf.) Gill	+	..	..	..	..	..	..	+	+	+	+	+	+	
Ambloplites cavifrons, Cope	..	+	..	..	..	..	..	..	..	..	..	..	..	
Chænobryttus gulosus, (C. & V.) Gill	..	..	..	..	..	..	..	..	+	+	+	+	+	SW.
Chænobryttus viridis, (C. & V.) Jor	+	+	+	+	+	..	+	..	..	..	..	..	..	SE.
Apomotis cyanellus, (Raf.) C. & J.	..	..	..	..	..	..	..	..	..	..	+	+	+	W.
Lepomus pallidus, (Mit.) G. & J.	..	..	..	+	..	..	..	+	+	+	+	+	+	
Lepomus obscurus, (Ag.) Jor	..	..	..	..	..	..	..	..	+	+	+	..	..	
Lepomus ischyrus, J. & N.	..	..	..	..	..	..	..	..	..	..	..	..	+	
Lepomus auritus, (L.) Raf.	+	+	+	+	+	..	+	+	..	..	..	..	..	SE.
Lepomus macrochirus, Raf	..	..	..	..	..	..	..	..	..	..	..	+	+	
Lepomus anagallinus, Cope.	..	..	..	..	..	..	..	..	..	..	..	+	..	W.
(Lepomus) bombifrons, Ag	..	..	..	..	..	..	..	..	..	..	..	..	..	
Xenotis megalotis, (Raf. Jor	..	..	..	..	..	..	..	..	..	..	+	+	+	N.
Xenotis aureolus, Jor	..	..	..	..	..	..	..	..	..	..	..	+	+	
Xenotis lythrochloris, Jor	..	..	..	..	..	..	..	..	..	..	..	+	..	
Xenotis inscriptus, (Ag.) Jor	..	..	..	..	..	..	..	..	+	+	..	+	..	
Xenotis peltastes, (Cope) Jor	..	..	..	..	..	..	..	..	..	..	..	..	+	N.
Xenotis sanguinolentus, Ag.) Jor	..	..	..	..	..	+	..	..	+	+	..	..	..	
(Xystroplites) notatus, Ag	..	..	..	..	..	..	..	..	..	+	..	..	..	
Eupomotis pallidus, (Ag.) G. & J.	..	..	..	..	..	..	..	..	+	+	..	+	..	
Eupomotis aureus, Walb. G. & J.	+	..	+	+	+	..	..	..	..	..	..	..	+	NE.
Enneacanthus pinniger, G. & J.	..	..	+	..	..	..	..	..	..	..	..	..	..	
Enneacanthus margarotis, Gill & Jor	+	..	+	..	..	..	..	..	..	..	..	..	..	
Hemioplites simulans, Cope	+	..	..	..	..	..	..	..	..	..	..	..	..	
Centrarchus irideus, Lac.) C. & V.	..	..	+	..	..	..	..	..	+	..	..	+	..	S.
Centrarchus macropterus, (Lac.) Jor.	..	..	..	..	..	..	+	..	..	..	..	..	..	
Pomoxys nigromaculatus, (Le S.) Grd.	+	..	+	..	..	..	..	..	+	..	+	+	+	
Pomoxys annularis, Raf	..	..	+	..	..	..	..	..	+	+	+	+	+	
Haplotonotus grunniens, Raf.	..	..	..	..	..	..	..	..	+	+	+	+	+	N.
Aphododerus sayanus, (Gilliams) DeKay	..	..	+	..	..	..	..	+	+	..	..	+	+	
Eucalia inconstans, (Kirt.) Jor	..	..	..	..	..	..	..	..	..	..	..	..	+	N.
Labidesthes sicculus, Cope	..	..	..	..	..	..	..	..	..	+	+	+	+	N.

Table showing the Distribution of the Species in the Different River-Basins—Continued.

	James.	Rannoke.	Neuse.	Great Pedee.	Santee.	Savannah.	Altamaha.	Chattahoochee.	Alabama.	Tennessee.	Cumberland.	Ohio.	Illinois.	General range.
Fundulus diaphanus, (Le S.) Ag	...	...	...	...	...	...	...	...	...	...	...	...	+	
Xenisma stelliferum, Jor	...	...	...	...	...	...	...	...	+	...	...	...	...	
Xenisma catenatum, (Stor.) Jor	...	...	...	...	...	...	...	...	...	+	+	...	...	
Zygonectes dispar, Ag	...	...	...	...	...	...	...	...	...	...	...	+	+	
Zygonectes nottii, Ag	...	...	...	...	...	+	...	...	+	...	...	...	...	
Zygonectes melanops, Cope	+	...	+	...	...	...	...	...	...	...	...	+	...	
Zygonectes atrilatus, J. & B.*	...	...	+	...	...	...	...	...	...	...	...	...	...	
Zygonectes guttatus, Ag	..	...	...	...	...	...	...	...	+	...	...	...	.	
Zygonectes hieroglyphicus, Ag	...	...	...	...	...	...	...	...	+	...	...	...	...	
Zygonectes notatus, (Raf.) Jor	...	...	...	...	...	...	...	...	...	+	+	+	+	NW.
Melanura limi (Kirt. Ag	...	...	...	...	...	...	...	...	...	...	...	+	+	N.
Melanura pygmæa, (DeKay) Baird	+	...	+	...	...	...	...	...	...	...	...	...	...	
Amblyopsis spelæus, DeKay	...	...	...	...	...	...	...	...	...	...	...	+	...	
Typhlichthys subterraneus, Grd	...	...	...	...	...	...	...	...	...	...	...	+	...	
Chologaster agassizi Putn	..	...	...	...	...	...	...	...	...	...	...	+	...	
Esox reticulatus, Le S	+	...	+	...	+	...	+	...	+	...	...	...	.	NE.
Esox (raveneli, Holbr.)	...	...	+	...	+	...	...	...	+	...	...	...	...	
Esox (crassus, Ag.)	...	...	...	...	...	...	...	...	...	+	...	...	...	
Esox salmoneus, Raf	..	..	..	..	..	..	..	..	..	..	..	+	+	N.
Esox cypho, Cope	..	.	..	..	..	..	..	..	..	..	..	+	+	N.
Esox lucius, L	..	..	..	..	..	..	..	..	..	..	..	..	+	N.
Percopsis guttatus, Ag	...	...	...	...	...	...	...	...	...	...	...	+	+	N.
Salvelinus fontinalis, (Mit.) Gill & Jor	+	+	..	..	+	..	..	..	..	+	..	+	.	N.
Coregonus artedi sisco, Jor	..	...	..	..	..	..	..	..	..	..	..	+	..	
Hyodon tergisus, Le S	..	...	..	..	..	..	..	..	..	..	+	+	+	N.
Hyodon selenops, Jor. & Bean	..	...	..	..	..	..	..	..	+	+	+	..	..	
Dorosoma cepedianum heterurum, (Raf.) Jor	...	...	..	..	..	..	..	..	+	+	+	+	+	
Pomolobus chrysochloris, Raf.	.	...	..	..	..	..	..	..	..	+	+	+	+	
Campostoma, anomalum (Raf.) Ag	+	+	..	..	+	..	..	+	+	+	+	+	+	N.
Hybognathus argyritis, Grd	...	...	+	..	+	..	..	..	..	..	..	+	+	W.
Hybognathus nuchalis, Ag	...	...	..	..	..	..	..	..	..	..	..	+	+	
Pimephales promelas, Raf	...	..	..	..	..	..	..	..	..	..	+	+	+	N.
Hyborhynchus notatus, (Raf.) Ag	...	...	...	...	...	...	...	...	.	+	+	+	+	N.
Hyborhynchus superciliosus, Cope	..	...	...	...	...	...	...	...	...	...	.	+	+	
Ericymba buccata, Cope	...	...	...	...	...	...	...	...	...	...	...	+	..	
Luxilus cornutus, (Mit.) Jor	+	+	+	...	...	...	...	...	+	+	+	+	+	N.
Photogenis galacturus, (Cope) Jor	..	..	..	...	...	+	...	...	..	+	+	..	...	
Photogenis analostanus (Grd.) Jor	+	...	+	+	+	...	...	..	..	..	+	+	+	
Photogenis leucopus J. & B	..	...	..	..	..	..	..	+	..	..	..	..	..	

Zygonectes trilatus, sp. no A short hic eet species, related o *Z. melanops* Cope. Body short and stout, compressed especially posteriorly the depth about times in the length o base of caudal. Head moderate, 3¾ imes n length moderately broad and flattened above, the mouth of the ordinary sort. Dorsal fin well back, moderately high, of about rays; anal larger than the dorsal, with seven rays: ventral fins quite small, not reaching quite to the anal: pectoral fins small: caudal fin rounded, of the usual form: scales large, in about 30 transverse series.

Coloration dull olive; no stripes nor bars: scales slightly dark-edged: each side with a large jet-black blotch on the sides of the body just above and somewhat in front of the vent: dorsal and anal fins speckled.

Numerous specimens, 1½ to 1¾ inches in length, nearly all females, distended with spawn. In all, the black side-blotch is very distinct. They were taken by Messrs. Brayton and Gilbert, in the Neuse River, near Goldsboro', with *Ioa vitrea*, *Noturus eleutherus*, *Achirus lineatus*, and other interesting species.

Table showing the Distribution of the Species in the Different River-Basins—Continued.

	James.	Roanoke.	Neuse.	Great Pedee.	Santee.	Savannah.	Altamaha.	Chattahoochee.	Alabama.	Tennessee.	Cumberland.	Ohio.	Illinois.	General range.
Photogenis niveus, (Cope) Jor					+									
Luxilus coccogenis, (Cope) Jor						+				+				
Hydrophlox rubricroceus, (Cope) Jor						+				+				
Alburnops chlorocephalus, (Cope) Jor					+									
Hydrophlox lutipinnis, J. & B														
Hydrophlox chiliticus (Cope) Jor														
Hydrophlox chrysomus, Jor									+					
Hydrophlox xænocephalus, Jor									+					
Hydrophlox lacertosus, (Cope) Jor										+				
Alburnops spectrunculus, (Cope) Jor										+				
Alburnops stramineus, (Cope) Jor												+	+	
Alburnops fretensis, (Cope) Jor													+	N.
Alburnops microstomus, (Raf.) Jor	+	+								+	+	+		
Alburnops saludanus, J. & B					+									
Alburnops amarus (Grd) Jor			+				+							NE.
Notropis dinemus, (Raf.) Jor										+	+	+	+	
Notropis rubellus, (Ag) Jor												+	+	N.
Notropis rubrifrons, (Cope) Jor												+	+	
Notropis micropteryx, (Cope) Jor										+	+			
Notropis dilectus, (Grd Jor												+		W.
Notropis altipinnis, (Cope) Jor				+										
Notropis stilbius, Jor									+					
Notropis telescopus, (Cope) Jor										+	+			
Notropis photogenis (Cope) Jor			+		+					+		+		
Notropis matutinus, (Cope) Jor			+											
Notropis lirus, Jor									+	+				
Lythrurus ardens, (Cope) Jor		+									+			
Lythrurus diplæmius (Raf.) Jor												+	+	
Codoma xænura Jor														
Codoma pyrrhomelas (Cope) Jor					+									
Codoma formosa, (Putn.) Jor														
Codoma callisema, Jor							+							
Codoma chloristia, J. & B					+									
Codoma cærulea, Jor									+					
Codoma trichroistia, Jor. & Gilbert									+					
Codoma callistia, Jor									+					
Codoma stigmatura, Jor									+					
Codoma eurystoma, Jor								+						
Episema leucioda, Cope										+				
Episema scabriceps, Cope												+		
Episema ariomma, Cope												+		
Hemitremia vittata, Cope											+			
Hemitremia heterodon, Cope													+	
Chrosomus erythrogaster, Raf	+	+								+	+	+	+	
Phoxinus neogæus, Cope													+	N.
Phoxinus flammeus, Jor. & Gilbert										+				
Gila elongata, (Kirt.) Jor													+	
Gila proriger, Cope												+		
Gila cestor, J. & B										+	+			
Gila vandoisula, (C. & V.) Jor	+	+		+	+									
Notemigonus chrysoleucus, (Mit.) Jor									+	+	+	+	+	N.

Table showing the Distribution of the Species in the Different River-Basins—Continued.

	James.	Roanoke.	Neuse.	Great Pedee.	Santee.	Savannah.	Altamaha.	Chattahoochee.	Alabama.	Tennessee.	Cumberland.	Ohio.	Illinois.	General range.
Notemigonus americanus, (L.) Jor.			+		+		+							
Phenacobius teretulus, Cope												+		
Phenacobius uranops, Cope										+	+			
Phenacobius scopiferus, (Cope) Jor													+	
Phenacobius catostomus, Jor									+					
Rhinichthys atronasus, (Mit.) Ag	+	+												
Rhinichthys obtusus, Ag										+		+	+	
Rhinichthys meleagris, Ag													+	W.
Rhinichthys nasutus, (Ayres) Ag												+		E.
Ceratichthys zanemus, J. & B					+									
Ceratichthys labrosus, Cope					+									
Ceratichthys monachus, Cope										+				
Ceratichthys dissimilis, (Kirt.) Grd										+	+	+	+	
Ceratichthys anblops, (Raf.) Grd											+	+		
Ceratichthys winchelli, (Grd.) Jor									+	+				
Ceratichthys rubrifrons, Jor						+	+							
Ceratichthys hypsinotus, Cope				+										
Ceratichthys biguttatus, (Kirt.) Baird	+	+	+	+	+	+	+	+		+	+	+	+	NW.
Semotilus bullaris, (Raf.) Jor	+													
Semotilus corporalis, (Mit.) Pat	+		+	+	+		+		+		+	+	+	
Semotilus thoreauianus, Jor								+						
Exoglossum maxillilingua, (Le S.) Hald	+	+										+		NE.
Quassilabia lacera, J. & B										+				
Placopharynx carinatus, Cope												+	+	
Myxostoma velatum, (Raf.) Jor			+	+	+					+		+	+	
Myxostoma album, (Cope) Jor					+									
Myxostoma coregonus, (Cope) Jor				+	+									
Myxostoma conus, (Cope) Jor				+										
Myxostoma thalassinum, (Cope) Jor				+										
Myxostoma pidiense, (Cope) Jor				+										
Myxostoma crassilabre, (Cope) Jor			+											
Myxost. macrolepidotum, (Le S.) Jor. et vars			+					+	+	+	+	+	+	
Myxostoma aureolum, (Le S.) Jor												+	+	
Myxostoma anisurum, (Raf.) Jor												+		
Myxostoma euryops, Jor									+					
Myxostoma cervinum, (Cope) Jor	+	+			+	+	+	+						
Myxostoma papillosum, (Cope) Jor				+	+		+							
Minytrema melanops, (Raf.) Jor									+		+	+	+	W.
Erimyzon sucetta, (Lac.) Jor			+		+		+	+	+		+	+	+	
Hypentelium nigricans, (Le S.) Jor	+	+				+				+	+	+	+	NW.
Hypentelium etowanum, Jor									+					
Catostomus commersoni, (Lac.) Jor	+	+	+	+	+					+	+	+	+	
Catostomus longirostris, Le S													+	
Cycleptus elongatus, (Le S.) Raf											+	+	+	
Carpiodes difformis, Cope												+	+	
Carpiodes cutisanserinus, Cope											+	+	+	
Carpiodes velifer, (Raf.) Ag												+	+	
Carpiodes cyprinus, (Le S.) Ag									+					NE.
Carpiodes bison, Ag										+		+	+	
Carpiodes carpio, (Raf.) Jor												+	+	
Ichthyobus bubalus, (Raf.) Ag												+	+	
Bubalichthys cyanellus, (Nels.) Jor												+	+	W.

Table showing the Distribution of the Species in the Different River-Basins—Continued.

	James.	Roanoke.	Neuse.	Great Pedee.	Santee.	Savannah.	Altamaha.	Chattahoochee.	Alabama.	Tennessee.	Cumberland.	Ohio.	Illinois.	General range.
Bubalichthys urus, Ag	...	...	...	...	...	...	...	...	...	+	...	+	+	
Ichthælurus furcatus (C. & V.) Gill	...	...	...	...	...	...	...	...	...	...	...	+	..	SW.
Ichthælurus robustus, Jor	...	...	...	...	...	...	...	...	...	...	...	...	+	
Ichthælurus punctatus, (Raf.) Jor	...	...	...	...	...	+	+	+	+	+	+	+	+	W.
Amiurus albidus, (Le S.) Gill	+	...	+	...	...	...	...	...	...	...	...	...	...	
Amiurus niveiventris, Cope	...	...	+	...	...	...	...	...	...	...	...	...	...	
Amiurus nigricans, (Le S.) Gill	...	...	...	...	...	...	...	...	...	...	...	+	+	N. & S.
Amiurus natalis, (Le S.) Gill	...	...	+	...	...	...	...	...	+	+	+	+	+	
Amiurus catus, (L.) Gill	+	+	+	...	...	...	...	...	...	...	...	+	+	
Amiurus xanthocephalus, (Raf.) Gill	...	...	...	...	...	...	...	...	...	...	...	+	+	
Amiurus melas, (Raf.) J. & C	...	...	...	...	...	...	...	...	...	...	...	+	+	W.
Amiurus marmoratus, (Holbr.) Jor	...	...	...	...	...	...	+	...	...	...	...	+	..	
Amiurus platycephalus, (Grd.) Gill	...	...	...	...	+	+	...	...	...	...	...	...	...	
Amiurus brunneus, Jor	...	...	...	+	+	...	+	+	...	...	...	...	...	
Pelodichthys olivaris, (Raf.) G. & J	...	...	...	...	...	...	...	...	...	+	+	+	+	
Noturus flavus Raf	...	...	...	...	...	...	...	...	...	...	...	+	+	M.
Noturus insignis, (Rich.) G. & J	+	...	...	+	+	...	...	...	...	...	...	+	..	NE.
Noturus exilis, Nels	...	...	...	...	...	...	...	...	...	...	...	+	+	NW.
Noturus leptacanthus, Jor	...	...	...	...	...	...	...	+	+	...	...	...	...	
Noturus sciurus, Jor	...	...	...	...	...	...	...	...	...	...	...	+	+	W.
Noturus miurus, Jor	...	...	...	...	...	...	...	...	...	...	...	+	+	
Noturus eleutherus, Jor	...	...	+	...	...	...	...	...	...	+	...	...	...	
Anguilla vulgaris, Flem	+	+	+	+	+	+	+	+	+	+	+	+	+	
Amia calva L	...	...	...	...	...	...	...	...	...	+	...	+	+	
Lepidosteus osseus, (L.) Ag	...	...	...	+	+	...	...	+	+	+	+	+	+	
Lepidosteus platystomus, Raf	...	...	...	...	...	...	...	...	...	...	+	+	+	W.
Litholepis spatula, (Lac.) Jor	...	...	...	...	...	...	...	...	...	...	...	+	+	
Scaphirhynchops platyrhynchus, (Raf.) Gill	...	...	...	...	...	...	...	...	...	...	...	+	+	
Polyodon folium, Auct	...	...	...	...	...	...	...	...	...	+	+	+	+	
Acipenser rubicundus, Le S	...	...	...	...	...	...	...	...	...	+	...	+	+	
Acipenser maculosus, Le S	...	...	...	...	...	...	...	...	...	+	...	+	+	
Ammocœtes argenteus, (Kirt.)	...	...	...	...	...	...	...	...	...	...	...	+	+	
Ammocœtes niger, (Raf.)	...	...	...	...	...	...	...	...	...	...	...	+	+	
Ammocœtes hirundo, (Grd.)	...	...	...	...	...	...	...	...	...	...	...	+	...	
Total	35	19	42	24	40	14	24	22	55	84	66	138	117	

From the above table, it will be seen that the number of species inhabiting any one river-basin rapidly increases as we leave the Atlantic streams for those of the Gulf. The following table shows the arrangement of the species from another point of view—omitting reference to the range of the species outside of the thirteen rivers included in this table:

Known only from the—	Species.	Known only from the—	Species.
Ohio	30	Tennessee	16
Alabama	17	Illinois	14

Known only from the—	Species.	Known only from the—	Species.
Santee	10	James	3
Altamaha	7	Cumberland	2
Great Pedee	6	Roanoake	1
Neuse	7	Savannah	0
Chattahoochee	4		

Common to—	Species.
Ohio and Illinois	39
Cumberland and Tennessee	10
Tennessee, Cumberland, Ohio, and Illinois	10
Cumberland, Ohio, and Illinois	10
Alabama, Tennessee, Cumberland, Ohio, and Illinois	6
James and Neuse	4
Tennessee, Ohio, and Illinois	4
Alabama and Tennessee	3
Savannah and Tennessee	2
Alabama, Tennessee, and Cumberland	2
Great Pedee and Santee	2
Cumberland and Ohio	2

Distribution of Genera.

	Great Lakes.	Connecticut.	Delaware.	Susquehanna.	James.	Roanoke.	Neuse.	Great Pedee.	Santee.	Savannah.	Altamaha.	Chattahoochee.	Alabama.	Tennessee.	Cumberland.	Ohio.	Illinois.	Wisconsin.	Lower Mississippi.
Lota	+	+														+	+	+	
Uranidea	+	+	+	+															
Potamocottus	+				+								+	+	+	+	+	+	+
Tauridea	+																		
Triglopsis	+																		
Ammocrypta																			+
Pleurolepis													+			+	+		
Ioa*							+												
Percina	+			+									+	+	+	+	+	+	
Alvordius	+			+			+		+					+	+	+	+	+	
Ericosma																+			
Hadropterus										+	+	+	+	+	+	+			
Imostoma																+	+		
Rheocrypta																+			
Ulocentra													+		+				+
Diplesium	+				+									+	+	+	+		

*Ioa (J. & B.), gen. nov.: type *Paxilichthys vitreus* Cope. This genus is distinguished from *Pcarolepis* by the presence of two anal spines instead of one, and by the greater scaliness of the ventral region. The name is from ἰός, an arrow or dart.

Distribution of Genera—Continued.

	Great Lakes.	Connecticut.	Delaware.	Susquehanna.	James.	Roanoke.	Neuse.	Great Pedee.	Santee.	Savannah.	Altamaha.	Chattahoochee.	Alabama.	Tennessee.	Cumberland.	Ohio.	Illinois.	Wisconsin.	Lower Mississippi.
Boleosoma	+	+	+	+	+	..	+	+	+	..	+	..	..	+	+	+	+	+	..
Nothonotus	..	..	..	..	.	..	..	..	+	..	+	..	..	+	+	+	..	..	..
Poecilichthys	+	..	..	..	.	..	..	..	..	..	..	..	..	+	+	+	+	+	+
Etheostoma	+	..	..	..	+	+	..	..	+	..	..	..	..	+	+	+	..	+	..
Boleichthys	+	+	+	..	..	..	..	..	.	..	..	..	+	..	..	+	+	+	+
Vaillantia*	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	..	..
Microperca	+	..	.	..	..	..	..	..	.	..	..	..	..	..	..	+	+	+	..
Elassoma	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	..	..	+
Perca	+	+	+	+	..	..	+	..	..	..	..	..	..	..	..	..	+	+	..
Stizostethium	+	..	..	..	..	..	..	..	..	..	..	..	+	+	+	+	+	+	..
Micropterus	+	..	..	..	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Ambloplites	+	..	..	..	+	..	..	..	.	..	..	+	+	+	+	+	+	+	+
Acantharchus	..	..	+	..	..	..	+	..	..	..	..	..	..	..	..	..	..	..	..
Chænobryttus	+	..	..	..	+	+	+	+	+	..	+	..	+	+	+	+	+	+	..
Apomotis	+	..	+	..	..	..	..	..	..	..	..	..	..	..	+	+	+	+	+
Lepiopomus	+	+	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+
Xenotis	+	..	..	..	..	..	..	..	..	+	..	..	+	+	+	+	+	+	+
Xystroplites	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+
Eupomotis	+	+	+	+	+	..	+	+	+	..	..	..	+	+	..	..	+	+	..
Mesogonistius	..	..	+	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Enneacanthus	..	+	+	+	+	..	+	..	..	..	..	..	..	..	..	..	..	..	..
Hemioplites	..	..	..	..	+	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Copelandia	+	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Centrarchus	..	..	..	..	..	..	+	..	..	..	+	..	+	..	..	+	..	..	+
Pomoxys	+	..	+	..	+	..	+	..	..	..	..	..	+	+	+	+	+	+	+
Haploidonotus	+	..	..	..	..	..	..	..	..	..	..	..	+	+	+	+	+	+	+
Aphododerus	+	..	+	+	..	..	+	..	..	..	..	+	+	..	..	+	+	..	+
Eucalia	+	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	..
Pygosteus	+	..	..	..	..	..	.	..	..	..	..	..	..	..	..	..	..	..	..
Labidesthes	+	..	..	..	..	..	..	..	..	..	..	..	..	+	+	+	+	+	..
Fundulus	+	+	+	+	..	..	..	..	..	..	..	..	..	..	..	..	+	+	+
Xenisma	..	..	..	..	..	..	..	..	..	..	..	..	+	+	+	..	..	..	..
Zygonectes	+	..	..	..	+	..	+	..	..	+	..	..	+	+	+	+	+	+	+
Gambusia	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+
Girardinus	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+
Mollienesia	..	..	..	..	.	.	..	..	..	..	..	..	..	..	..	..	..	..	+
Melanura	+	+	+	+	+	..	+	..	..	..	..	..	..	..	..	+	+	+	..
Amblyopsis	..	..	..	..	.	..	..	..	..	..	..	..	..	..	..	+	..	..	..
Typhlichthys	..	..	..	..	.	..	..	..	..	..	..	..	..	..	..	+	..	..	..
Chologaster	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	..	..	..
Esox	+	+	+	+	+	..	+	..	+	..	+	..	+	+	+	+	+	+	..
Tetragonopterus	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+
Percopsis	+	..	+	..	..	..	..	..	..	..	..	..	..	..	..	+	+	+	..
Salvelinus	+	+	+	+	+	+	..	..	+	+	..	..	..	+	..	+	..	+	..
Cristivomer	+	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Thymallus	+	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Coregonus	+	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	..	+	..
Hyodon	+	..	..	..	..	..	..	..	..	..	..	..	+	+	+	+	+	+	+

*VAILLANTIA (Jordan), gen. nov.: type *Boleosoma Camurum* Forbes. This genus differs from *Boleichthys* in having the upper jaw protractile, and the anal spines very feeble. From *Boleosoma*, with which it agrees in these respects, it is distinguished by the incomplete lateral line. It is named for Prof. Léon Vaillant, of Paris, whose thoroughly excellent monograph of the *Etheostomatidæ* is still the starting-point for all work on that difficult but most interesting group.

Distribution of Genera—Continued.

	Great Lakes.	Connecticut.	Delaware.	Susquehanna.	James.	Roanoke.	Neuse.	Great Pedee.	Santee.	Savannah.	Altamaha.	Chattahoochee.	Alabama.	Tennessee.	Cumberland	Ohio.	Illinois.	Wisconsin.	Lower Mississippi.
Pomolobus	+													+	+	+	+		+
Dorosoma	+												+	+	+	+	+		+
Campostoma	+				+	+			+			+	+	+	+	+	+	+	+
Hybognathus			+				+		+							+	+		
Pimephales	+													+	+	+	+	+	
Hyborhynchus	+														+	+	+	+	
Luxilus (proper)	+	+	+	+	+	+	+						+	+	+	+	+	+	+
Photogenis	+		+	+	+		+	+	+	+		+		+	+	+	+	+	
Hydrophlox	+		+					+	+	+	+		+	+	+				
Alburnops	+		+	+	+	+							+	+	+	+	+	+	+
Hudsonius	+		+	+			+		+		+								
Lythrurus	+					+									+	+	+	+	
Cyprinella																+			+
Codoma									+		+	+	+	+					
Notropis	+		+				+	+	+				+	+	+	+	+	+	+
Episema														+		+			+
Phenacobius													+	+	+	+	+		+
Hemitremia		+	+	+										+	+		+	+	
Chrosomus	+			+	+	+								+	+	+	+	+	
Phoxinus	+			+										+			+	+	
Gila	+		+		+	+		+	+					+	+	+	+	+	
Notemigonus	+	+	+	+			+	+	+		+		+	+	+	+	+	+	+
Rhinichthys	+	+	+	+	+	+							+	+	+	+	+	+	
Ceratichthys	+			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
Semotilus	+	+	+	+	+		+	+	+		+		+	+	+	+	+	+	
Ericymba																+			
Exoglossum				+	+	+										+			
Quassilabia														+		+			
Placopharynx														+		+	+		
Myxostoma	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Minytrema	+								+				+	+	+	+	+		+
Erimyzon	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Catostomus	+	+	+	+	+	+	+	+	+					+	+	+	+	+	
Cycleptus															+	+	+	+	+
Carpiodes	+			+									+	+	+	+	+	+	+
Ichthyobus																+	+	+	+
Bubalichthys													+	+	+	+	+	+	+
Ichthælurus	+									+	+	+	+	+	+	+	+	+	+
Amiurus	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Pelodichthys														+	+	+	+		+
Noturus	+		+	+	+		+	+	+			+	+	+	+	+	+		+
Anguilla	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		+
Amia	+													+		+	+	+	+
Lepidosteus	+		+	+				+	+			+	+	+	+	+	+	+	+
Litholepis																+	+		+
Polyodon														+	+	+	+		+
Acipenser	+													+		+	+	+	+
Scaphirhynchops																+	+	+	+
Ammocœtes	+															+	+	+	+
Total	69	21	35	32	32	19	29	19	28	12	19	15	40	59	56	83	63	65	53

CONCLUSIONS.*

In the course of the investigations detailed in this paper, some light has been thrown on the laws which govern the distribution of fresh-water fishes in general. The writer has collated the known facts into a series of general propositions, which, without any pretense to exhaustiveness or to originality, are here briefly stated. It may be premised that some of these propositions are only half truths, to be more completely stated when our knowledge of the subject shall be increased. Most of the statements also refer chiefly to the smaller and non-migratory fishes, especially the *Etheostomatidæ*, *Centrarchidæ*, and *Cyprinidæ*. Our knowledge of the range of the larger *Catostomidæ* and *Siluridæ* is still very meagre.

For the first statement of several of the following propositions, we are indebted to Professor Cope, who has ably discussed the subject of the distribution of fishes in his paper on the Fishes of the Alleghany Region of Southwest Virginia, Journ. Acad. Nat. Sc. Phila. 1868, pp. 239–247.

I. In the case of rivers flowing into the *ocean*, the character of the faunæ of the upper waters, compared one with another, bears no, or very little, relation with the places of discharge. In illustration of this we may note (*a*) the similarity of the faunæ of the Chattahoochee and Altamaha, as compared with the Chattahoochee and Alabama. The faunæ of Wisconsin River and of Red River of the North are very similar.

II. River-basins having a similar discharge into some larger river or lake have a similarity of fauna, due to this fact, and, in general, other things being equal, the nearer together the places of discharge, if in *fresh water*, the greater the similarity. The almost identical faunæ of the Catawba and the Saluda will illustrate this.

III. Parallel rivers tributary to the same stream have, other things being equal, more in common than streams coming from opposite directions. The Wabash and Miami have more in common than either has with the Kentucky.

IV. The higher or the older the water-shed between two streams, the fewer species are common to both. (This matter needs further investigation.)

V. Certain species, not including "species of general distribution", occur on opposite sides of even the highest watersheds. This fact was first noticed by Professor Cope. The occurrence of *Luxilus coccogenis*,

*An abstract of the remaining part of this paper appeared in the American Naturalist for October, 1877 (pp. 607–613). For this part, Professor Jordan is alone responsible.

Hydrophlox rubricroceus, *Photogenis galacturus*, and *Catostomus nigricans*, both in the Tennessee and Savannah, will illustrate this. Neither of the two first-named species are as yet known from any other river-basins.

VI. When the watershed between two streams is a swampy upland instead of a mountain-range, the same species may be found in the headwaters of both, although the species inhabiting the lower courses may be different. In case the one stream flows northward and the other southward, the common fauna will be nearest like that of the northern stream.

In Northern Indiana, the same species are found in the waters of Saint Joseph's, Maumee, Wabash, and Illinois Rivers, although these streams discharge their waters in widely different directions. The swampy watershed between them is often overflowed in the spring, affording to the smaller fishes an easy means of migration.

VII. In any river-basin, many of the species inhabiting small streams are different from those occurring in the river-channels. Among the brook species may be mentioned *Eucalia inconstans*, *Pœcilichthys spectabilis*, *Xenotis lythrochloris*, *Xenisma stelliferum*, *Salvelinus fontinalis*, *Ericymba buccata*, *Semotilus corporalis*, *Chrosomus erythrogaster*, the species of *Rhinichthys*, etc. Of channel species, *Haploidonotus*, *Hyodon*, *Dorosoma*, *Pomolobus*, *Roccus chrysops*, all the "Buffalo-fishes", and the larger *Siluridæ*, *Ichthælurus punctatus*, *Pelodichthys olivaris*, *Amiurus nigricans*, and the like, will serve as examples.

VIII. Many species inhabiting the upper course of a stream are different from those of the lower. This subject has been ably discussed by Professer Cope, but further investigations, especially of the rivers of the Southern States, are very desirable.

IX. This difference between the upper fauna and the lower is due to differences in the character of the river itself, such as climate, condition of water, character of river-bed, supply of food, etc.

X. Hence, if in the same river basin there are two streams flowing into a larger stream, the one near its source, the other near its mouth, if the two streams are similar in all known physical respects, their faunæ will be similar, and if dissimilar, they will have different faunæ. The general identity of the faunæ of Elk River and Powell's River may be noticed in this connection.

XI. Some species of fishes are confined strictly to a single river-basin, while other species, with apparently no better means of diffusion or of defense, are widely distributed, inhabiting many rivers. In illustration of this, the limited range of each of the species of *Codoma* may be com-

pared with the range of *Luxilus cornutus*. In the genus *Ceratichthys*, *C. biguttatus* probably occurs in every stream from the Susquehanna to the Great Salt Lake, while four other species of the same genus, *C. micropogon*, *C. monachus*, *C. zanemus*, and *C. labrosus*, are each, so far as is known, confined to a single river-basin.

XII. In any river-basin, the most abundant species (of small fishes) are usually (*a*) those peculiar to it, or (*b*) those of the widest distribution. In illustration of this, we may notice the abundance of *Codoma pyrrhomelas* and *Notropis photogenis* in the Santee; of *Codoma stigmatura* and *Luxilus cornutus* in the Alabama; of *Codoma eurystoma* and *Ceratichthys biguttatus* in the Chattahoochee; of *Codoma xænura* and *Notemigonus americanus* in the Ocmulgee. To this rule, however, there are many exceptions and modifications.

XIII. In general, the further south any river-basin lies, the more species are peculiar to it, and the greater the differences between its fauna and that of the neighboring streams. In illustration of this, the differences existing between the faunæ of the Alabama and Chattahoochee may be compared with those between the faunæ of the Susquehanna and Delaware. Twelve genera are known to be common to the Chattahoochee and Alabama, and twenty-three to the Susquehanna and Delaware. In the Southern streams, the process of evolution of specific forms seems to have gone on more rapidly. This matter, however, requires further investigation.

XIV. Species of the widest distribution often have breaks in their range which cannot be accounted for by any facts now in our possession. *Luxilus cornutus*, so abundant in all the waters of the North and West, does not occur, so far as is known, in any of the rivers between the Neuse and the Alabama, in both of which streams it is abundant. Various species range over several river-basins and then cease abruptly. *Amiurus brunneus* is abundant from the Santee to the Chattahoochee, in the latter river the most abundant food-fish, while in the very next river-basin, the Alabama, it is unknown.

XV. Many species of wide distribution which are absent in certain streams are there represented by certain other related species, which may be regarded as modified descendants. Thus, in the South Atlantic streams, *Chænobryttus gulosus* is represented by *Chænobryttus viridis*, *Notemigonus chrysoleucus* by *Notemigonus americanus*. In the Southwest, *Eupomotis aureus* is represented by *Eupomotis pallidus*; in the West, *Noturus gyrinus* by *Noturus sialis*, *Noturus insignis* by *Noturus*

exilis, *Noturus eleutherus* by *Noturus miurus*, *Melanura pygmæa* by *Melanura limi*.

XVI. Other species under similar circumstances have no such representatives. The case of *Luxilus cornutus* will again illustrate.

XVII. Certain species have been known to extend their geographical range since the opening of the canals. Such are more especially the migratory species of probably marine origin, as *Dorosoma heterura*, *Pomolobus chrysochloris*, and *Anguilla vulgaris*. These species are now abundant in Lake Michigan and Lake Erie, although formerly unknown there. The range of certain *Percidæ* and *Centrarchidæ* has undoubtedly been extended by the same means.

XVIII. The characteristically American forms of fishes are, generally speaking, rare or absent in the waters of New England and of the Pacific slope. This fact has been well stated by Professor Agassiz, who called New England "a zoological island".

About 105 genera of fresh-water fishes occur in the waters of the United States east of the Mississippi River. Of these, about 76 do not occur in New England (exclusive of Lake Champlain, the fauna of which is nearly identical with that of Lake Ontario.) Of these 30 or fewer genera occurring in New England, all but *Salvelinus*, *Coregonus*, *Esox*, *Semotilus*, *Rhinichthys*, and possibly *Amiurus*, are represented by a single species each. From 30 to 35 genera occur in the waters of the Pacific slope.

XIX. The larger the river-basin, the greater its variety of forms, both genera and species. In the little White River at Indianapolis, belonging to the Mississippi basin, 70 species, representing 48 genera, are known to occur—twice as many as inhabit all the rivers of New England.

XX. Other things being equal, a river whose course lies in a region of undisturbed stratified rocks or of glacial drift contains most genera and species.

XXI. Conversely, rivers in regions of igneous or metamorphic rock contain fewest species.

XXII. Sources of streams on opposite sides of a high watershed often have species in common which do not occur in the lower courses of the same rivers. The distribution of several mountain species, as *Salvelinus fontinalis* and *Hydrophlox rubricroceus*, will exemplify this.

XXIII. Certain species have a compact geographical range, occurring in all the rivers within this range, without apparent regard to the direction of their flow. Such are *Lepiopomus obscurus* in the Alabama, Ten-

nessee, and Cumberland, and *Alburnops microstomus* in the James, Roanoke, Kentucky, Cumberland, and Clinch.

XXIV. Certain species have a wide east and west range, without apparent regard to the courses of the rivers, but are bounded on either the north or the south by parallels of latitude.

Eucalia inconstans occurs from Western New York to Kansas and northward, but it is never found southward of a line passing about fifty miles south of Lake Erie. *Percopsis guttatus* has a like range, but its southern boundary is in the Potomac and Ohio. *Lota lacustris* is similarly circumscribed, but ranges farther to the east. The three species of *Lythrurus* have each a belt of latitude: *L. cyanocephalus* belonging to the Great Lakes and Upper Mississippi; *L. diplæmius* to the Ohio and the Potomac; *L. ardens* to the Roanoke, James, and Cumberland. The three species of *Hyodon* are similarly arranged.

XXV. Certain species have a peculiar northern and eastern range, occurring in the waters of the Upper Mississippi, in the headwaters of the Illinois, Wabash, and Scioto, thence through the Great Lakes to New England, thence to South Carolina on the eastern slope of the Alleghanies. Such species are *Eupomotis aureus*, *Perca americana*, and *Amiurus catus*.

XXVI. Certain species have a peculiar northern and western range, occurring in the Middle States and in the Great Lakes, and usually southward in the east to some point in Virginia or North Carolina, ceasing in the same latitude on both sides of the Alleghanies, but extending southwestward through the Mississippi Valley to the Gulf of Mexico. Among these may be mentioned *Luxilus cornutus*, *Notemigonus chrysoleucus*, *Ambloplites rupestris*, *Apomotis cyanellus*. The last-named species, however, scarcely ranges east of the Alleghanies.

XXVII. Certain species have a wide range north and south, either east or west of the Alleghanies, but do not cross that chain. Of these may be mentioned *Lepiopomus auritus*, *Enneacanthus obesus*, *Esox reticulatus*, etc., on the east, and *Haploidonotus grunniens*, *Hyodon tergisus*, *Noturus miurus*, *Noturus sialis*, etc., on the west.

XXVIII. The distribution of fresh-water fishes is dependent (*a*) on fresh-water communication; (*b*) on character of stream, *i. e.*, of water—as to purity, depth, rapidity, vegetable growth, etc.; (*c*) on the character of the river-bed; (*d*) on climate, as determined by latitude and by elevation above the sea; and (*e*) finally on various unknown factors arising from the nature or past history of the species in question, and from the geological history of the rivers.

B.

A SYNOPSIS OF THE FAMILY CATOSTOMIDÆ.

By David S. Jordan.

Class PISCES.

Subclass TELEOSTEI.

Order TELEOCEPHALI.

Suborder EVENTOGNATHI.

Family CATOSTOMIDÆ.

Catostomoidæ Gill., Proc. Acad. Nat. Sc. Phila. v. 13, p. 8, 1861.
Catostomidæ Cope, Proc. Am. Assoc. Adv. Sci. v. 20, p. 332, 1872.
Catostomidæ Jordan, Man. Vert. E. U. S. p. 292, 1876.
Cyprinidæ gen. Rafinesque, Risso, Cuvier, Bonaparte, Girard, Bleeker.
Cyprinidæ subfam. Heckel, Agassiz, Bleeker, Günther.

The family of *Catostomidæ*, or the "Suckers", may be briefly defined as follows:—*Eventognathous* fishes, having the pharyngeal teeth pectiniform, in a single row, closely approximated, very numerous, and compressed at right angles to the direction of the bone, and the intermaxillaries forming but a small part of the upper arch of the mouth, the maxillaries entering into it largely on each side.*

* The following more elaborate diagnosis is given by Professor Gill (Johnson's Universal Cyclopædia, vol. iv, p. 1574):—"The body varies between an elongated subcylindrical and an oblong more or less compressed contour; the scales are of medium or rather large size, cycloid; the lateral line is generally present and decurved, but some-

Early writers on fishes, as well as most foreign ichthyologists, have considered the Suckers as forming a mere tribe or subfamily of the *Cyprinidæ*, which group has been variously denominated *Catostomi*, *Catostomina*, and *Catostominæ*, but the characters above noted, of teeth and mouth, seem to the writer to fully justify their separation as a distinct family. The dorsal fin in *Catostomidæ* is more developed than is usual in American *Cyprinidæ*, although various Old World genera show similar characters. The development of the lips and the great protractility of the mouth are features usually diagnostic, but in the genus *Quassi'abia* the mouth is scarcely protractile, and among our *Cyprinidæ* certain species of *Phenacobius* and *Ceratichthys* have thicker lips than have some of the *Catostomidæ*.

The *Catostomidæ* fall at once into three well-marked subfamilies, first indicated by Professor Gill, and termed by him *Catostominæ*, *Cycleptinæ*, and *Bubalichthyinæ*. These may be characterized as follows:—

Catostominæ.—Body oblong or elongate, subterete or more or less compressed: dorsal fin nearly median, short and subquadrate, with from nine to eighteen developed rays: ventral fins under the dorsal, of nine or ten rays: anal fin high and short, normally of seven rays, nearer the base of the caudal than that of the ventral fins: lips well developed, usually papillose or plicate: gill-rakers little developed. Genera *Quassilabia*, *Placopharynx*, *Myxostoma*, *Erimyzon*, *Minytrema*, *Chasmistes*, *Catostomus*, *Pantosteus*.

Cycleptinæ.—Body elongate, slender: dorsal fin falciform, of about 30 rays, beginning over the interval between the pectoral and ventral fins, and extending as far back as the beginning of the anal fin: ventral fins 10 rayed; anal fin small, of about 7 rays: head extremely small: scales moderate, with the exposed surfaces broad: fontanelle entirely obliter-

times absent; the head is diversiform; the opercular bones normally developed; the nostrils double; the mouth more or less inferior, and provided with fleshy and generally papillose or crenated lips; the upper jaw is formed on the middle by the small and lamelliform intermaxillaries, and on the sides by the supramaxillaries; teeth are wanting in the jaws; the pharyngeal bones are developed in a falciform manner, and provided with a row of numerous comb-like teeth; the branchial apertures are restricted to the sides; branchiostegal rays three on each side; dorsal variable in development; anal posterior, and generally short and high; caudal large, and more or less emarginated; pectoral fins low down, but lateral and with their rays branched; ventral fins abdominal; the intestinal canal is very long; the stomach simple and destitute of pyloric cæca; the air-bladder is large, unprotected by an osseous capsule, and divided by transverse constrictions into two or three regions."

ated by the union of the parietal bones: mouth inferior, with thick papillose lips: gill-rakers moderate, soft. Genus *Cycleptus*.

Bubalichthyinæ.—Body stout, oblong-oval, and compressed. Dorsal fin elongate, beginning more or less in front of the ventral fins, and extending at least as far as the commencement of the anal, its rays 20 to 50 in number, the anterior ones more or less elongate: ventral rays usually 10: anal rays 8 to 12: head stout and heavy: mouth moderate or small, with thin lips: fontanelle open: gill-rakers of anterior arch long, slender, and stiff above, growing smaller downwards. Genera *Carpiodes*, *Bubalichthys*, *Ichthyobus*, *Myxocyprinus*.

As the chief purpose of this paper is to ascertain and make known the proper nomenclature of the valid genera and species of *Catostomidæ*, I shall omit further discussion of family and subfamily characters, and proceed at once to a catalogue of described species, arranged in chronological order, with the date and my identification of each species opposite its name. As is the case in nearly every group of American fishes, the number of nominal species is about three times the number really existing. It will be noticed that the number of species which I have admitted is in most of the Catostomoid genera fewer than has been recognized by previous writers. This seems to me to result not from any peculiar theories as to what constitutes a species, but from the fact that I have had a greater range of specimens of most forms than any previous writer has had. I am confident that in the presence of a still greater amount of material, the characters of several other species will be found to melt away. To indicate which these species are, in default of such material, would, however, be an unprofitable task. In this group, as in so many others, the truth well stated by Dr. Coues* becomes apparent:—"We can only predicate and define species at all from the mere circumstance of *missing links*. 'Species' are the twigs of a tree separated from the parent stems. We name and arrange them arbitrarily, in default of a means of reconstructing the whole tree according to Nature's ramifications."

* Birds of the Northwest, p. 227.

List of Nominal Species of Catostomidæ, with Identifications.

Nominal species.	Date.	Identification.
Cyprinus catostomus Forster	1773	Catostomus longirostris.
"*Le cyprin commersonien*"* Lacépède	1803	Catostomus teres.
Cyprinus sucetta Lacépède	1803	Erimyzon sucetta.
Cyprinus rostratus Tilesius	1813	(Catostomus) rostratus.
Cyprinus teres Mitchill	1814	Catostomus teres.
Cyprinus oblongus Mitchill	1814	Erimyzon sucetta.
Catostomus cyprinus Le Sueur	1817	Carpiodes cyprinus.
Catostomus gibbosus Le Sueur	1817	Erimyzon sucetta.
Catostomus tuberculatus Le Sueur	1817	Erimyzon sucetta.
Catostomus macrolepidotus Le Sueur	1817	Myxostoma macrolepidotum.
Catostomus aureolus Le Sueur	1817	Myxostoma aureolum.
Catostomus communis Le Sueur	1817	Catostomus teres.
Catostomus longirostrum Le Sueur	1817	Catostomus longirostris.
Catostomus nigricans Le Sueur	1817	Catostomus nigricans.
Catostomus maculosus Le Sueur	1817	Catostomus nigricans.
Catostomus elongatus Le Sueur	1817	Cycleptus elongatus.
Catostomus vittatus Le Sueur	1817	Erimyzon sucetta.
Catostomus duquesnii Le Sueur	1817	Myxostoma macrolepidotum duquesni.
Catostomus bostoniensis Le Sueur	1817	Catostomus teres.
Catostomus hudsonius Le Sueur	1817	Catostomus longirostris.
Catostomus bubalus Rafinesque	1818	Ichthyobus bubalus.
Catostomus erythrurus Rafinesque	1818	Myxostoma macrolepidotum duquesni.
Exoglossum macropterum Rafinesque	1818	Catostomus nigricans.
Amblodon niger Rafinesque	1819	Bubalichthys sp.?
Cycleptus nigrescens Rafinesque	1819	Cycleptus elongatus.
Rutilus melanurus Rafinesque	1820	Myxostoma macrolepidotum duquesni.
Catostomus anisurus Rafinesque	1820	Myxostoma anisura.
Catostomus anisopterus Rafinesque	1820	Carpiodes sp.
Catostomus carpio Rafinesque	1820	Carpiodes carpio.
Catostomus velifer Rafinesque	1820	Carpiodes velifer.
Catostomus xanthopus Rafinesque	1820	Catostomus nigricans.
Catostomus melanops Rafinesque	1820	Minytrema melanops.
Catostomus fasciolaris Rafinesque	1820	Erimyzon sucetta.
Catostomus flexuosus Rafinesque	1820	Catostomus teres.
Catostomus megastomus Rafinesque	1820	*A myth.*
Catostomus forsterianus Richardson	1823	Catostomus longirostris.
Catostomus lesueurii Richardson	1823	Myxostoma aureolum.

*This species is quoted by Dr. Günther as "*Cyprinus commersonnii* Lacépède". I have been unable to examine Lacépède's original work, but in the reprints of it, supposed to be literal, I find only the French form, "Le Cyprin Commersonien". Unless Lacépède really bestowed a Latinized specific name on the species, "*commersoni*" or "*commersonianus*" should not claim priority over *teres* of Mitchill.

List of Nominal Species of Catostomidæ, with Identifications—Continued.

Nominal species.	Date.	Identification.
Cyprinus (Catostomus) sueurii Rich....	1836	Myxostoma aureolum ?
Cyprinus (Catostomus) reticulatus Rich.	1836	Catostomus teres.
Catostomus gracilis Kirtland.....	1838	Catostomus teres.
Labeo elegans DeKay	1842	Erimyzon sucetta.
Labeo esopus DeKay.....	1842	Erimyzon sucetta.
Catostomus oneida DeKay.....	1842	Myxostoma macrolepidotum.
Catostomus pallidus DeKay.....	1842	Catostomus teres.
Labeo elongatus DeKay.....	1842	Erimyzon sucetta.
Catostomus fasciatus Le Sueur, MSS....	1844	Minytrema melanops.
Catostomus planiceps Valenciennes....	1844	Catostomus nigricans.
Catostomus carpio Valenciennes	1844	Myxostoma carpio.
Catostomus tilesii Valenciennes	1844	(Catostomus) rostratus.
Sclerognathus cyprinella Valenciennes.	1844	Ichthyobus bubalus.
Catostomus forsterianus Agassiz.....	1850	Catostomus teres.
Catostomus aurora Agassiz.....	1850	Catostomus longirostris.
Catostomus latipinnis Baird & Girard..	1853	Catostomus latipinnis.
Carpiodes urus Agassiz.....	1854	Bubalichthys urus.
Carpiodes taurus Agassiz.....	1854	Bubalichthys sp.
Carpiodes bison Agassiz.....	1854	Carpiodes bison.
Carpiodes vitulus Agassiz	1854	Bubalichthys sp.
Carpiodes vacca Agassiz.....	1854	Carpiodes cyprinus.
Castotomus congestus Baird & Girard..	1854	Myxostoma congestum.
Catostomus clarki Baird & Girard	1854	Catostomus clarki.
Catostomus insignis Baird & Girard...	1854	Catostomus insignis
Catostomus plebeius Baird & Girard...	1854	Pantosteus plebeius.
Carpiodes tumidus Baird & Girard.	1854	Carpiodes cyprinus.
Catostomus occidentalis Ayres.....	1854	Catostomus occidentalis.
Ichthyobus rauchii Agassiz.....	1855	Ichthyobus bubalus.
Ichthyobus stolleyi Agassiz.....	1855	Ichthyobus bubalus.
Moxostoma tenue Agassiz.	1855	Erimyzon oblongus.
Carpiodes thompsoni Agassiz.....	1855	Carpiodes thompsoni.
Bubalichthys niger Agassiz.....	1855	Bubalichthys urus.
Bubalichthys bubalus Agassiz	1855	Bubalichthys bubalus.
Bubalichthys bonasus Agassiz.....	1855	Bubalichthys urus.
Catostomus occidentalis Agassiz.....	1855	Catostomus occidentalis.
Catostomus labiatus Ayres	1855	Catostomus labiatus.
Carpiodes damalis Girard.....	1856	Carpiodes cyprinus.
Moxostoma claviformis Girard.....	1856	Erimyzon sucetta.
Moxostoma kennerlyi Girard	1856	Erimyzon sucetta.
Moxostoma victoriæ Girard.....	1856	Minytrema melanops.
Moxostoma campbelli Girard.....	1856	Erimyzon sucetta.
Ptychostomus albidus Girard	1856	Myxostoma albidum.
Ptychostomus haydeni Girard	1856	Minytrema melanops.

List of Nominal Species of Catostomidæ, with Identifications—Continued.

Nominal species.	Date.	Identification.
Catostomus (Acomus) guzmanensis Gir.	1856	Catostomus latipinnis.
Catostomus (Acomus) generosus Girard.	1856	Pantosteus generosus.
Catostomus (Acomus) griseus Girard...	1856	Catostomus longirostris.
Catostomus (Acomus) lactarius Girard.	1856	Catostomus longirostris.
Catostomus macrocheilus Girard.....	1856	Catostomus macrochilus.
Catostomus sucklii Girard.....	1856	Catostomus teres.
Catostomus bernardini Girard.....	1856	Catostomus occidentalis.
Catostomus texanus Abbott	1860	Catostomus teres.
Catostomus chloropteron Abbott.....	1860	Catostomus teres.
Carpiodes asiaticus Bleeker.....	1864	Myxocyprinus asiaticus.
Teretulus cervinus Cope.....	1868	Myxostoma cervinum.
Sclerognathus meridionalis Günther ...	1868	Bubalichthys meridionalis.
Placopharynx carinatus Cope.....	1870	Placopharynx carinatus.
Ptychostomus pappillosus Cope.....	1870	Myxostoma papillosum.
Ptychostomus velatus Cope.....	1870	Myxostoma velatum.
Ptychostomus collapsus Cope.....	1870	Myxostoma velatum.
Ptychostomus pidiensis Cope.....	1870	Myxostoma pidiense.
Ptychostomus coregonus Cope.....	1870	Myxostoma coregonus.
Ptychostomus albus Cope.....	1870	Myxostoma album.
Ptychostomus thalassinus Cope.....	1870	Myxostoma thalassinum.
Ptychostomus robustus Cope	1870	Myxostoma macrolepidotum.
Ptychostomus lachrymalis Cope.....	1870	Myx. macrolepidotum lachrymale.
Ptychostomus crassilabris Cope.....	1870	Myxostoma crassilabre.
Ptychostomus breviceps Cope	1870	Myxostoma anisura.
Ptychostomus conus Cope.....	1870	Myxostoma conus.
Carpiodes difformis Cope.....	1870	Carpiodes difformis.
Carpiodes cutisanserinus Cope.....	1870	Carpiodes cutisanserinus.
Carpiodes selene Cope.....	1870	Carpiodes cutisanserinus.
Carpiodes grayi Cope	1870	Carpiodes cyprinus.
Carpiodes nummifer Cope	1870	Carpiodes carpio.
Catostomus discobolus Cope.....	1872	Catostomus discobolus.
Minomus delphinus Cope.....	1872	Pantosteus (plebeius?).
Minomus bardus Cope.....	1872	Pantosteus (plebeius?).
Ptychostomus bucco Cope.....	1872	Myxostoma congestum.
Minomus platyrhynchus Cope	1874	Pantosteus platyrhynchus.
Minomus jarrovii Cope.....	1874	Pantosteus generosus.
Catostomus alticolus Cope.....	1874	Catostomus teres.
Ichthyobus cyanellus Nelson.....	1876	Bubalichthys bubalus.
Pantosteus virescens Cope.....	1876	Pantosteus virescens.
Catostomus fecundum Cope & Yarrow.	1876	Chasmistes fecundus.
Moxostoma trisignatum Cope.....	1876	Catostomus teres.
Ichthyobus ischyrus Nelson	1877	Ichthyobus bubalus.
Bubalichthys altus Nelson.....	1877	Bubalichthys bubalus.

List of Nominal Species of Catostomidæ, with Identifications—Continued.

Nominal species.	Date.	Identification
Myxostoma euryops Jordan	1877	Myxostoma euryops.
Bubalichthys bubalinus Jordan	1877	Bubalichthys bubalus.
Myxostoma pœcilura Jordan	1877	Myxostoma pœcilura.
Lagochila lacera Jordan & Brayton	1877	Quassilabia lacera.
Erimyzon goodei Jordan	1878	Erimyzon goodei.
Catostomus arœopus Jordan	1878	Catostomus arœopus.
Catostomus retropinnis Jordan	1878	Catostomus retropinnis.

ANALYSIS OF GENERA OF CATOSTOMIDÆ.

* Dorsal fin short, subquadrate, with ten to eighteen developed rays: body oblong or elongate: gill-rakers feeble. (*Catostominæ.*)

a. Mouth singular, the upper lip not protractile, greatly enlarged, the lower lip developed as two separate lobes: operculum very short: air-bladder in three parts: scales large: fontanelle well developed: lateral line present: pharyngeal bones and teeth ordinary.....QUASSILABIA, 1.

aa. Mouth normal, the lower lip entire or merely lobed, either tubercular or plicate.

b. Air-bladder in three parts: lateral line continuous: fontanelle present: scales large, subequal.

c. Pharyngeal bones very strong, with the lower teeth much enlarged, subcylindrical and truncate, the teeth of the upper part of the bone small and compressed: mouth large, somewhat oblique, with very thick lips .....PLACOPHARYNX, 2.

cc. Pharyngeal bones moderate, the teeth compressed, gradually larger downwards: mouth moderate or small, the lips usually plicate.

MYXOSTOMA, 3.

bb. Air-bladder in two parts.

d. Lateral line interrupted or wanting: scales large (40 to 50 in the course of the lateral line): lips plicate.

e. Lateral line incomplete, obsolete in the young, becoming developed in the adult, but always more or less interrupted: mouth small, inferior.

MINYTREMA, 4.

ee. Lateral line entirely wanting: mouth somewhat oblique..ERIMYZON, 5.

dd. Lateral line complete and continuous: scales small, 55 to 115 in the course of the lateral line.

f. Fontanelle present.

g. Mouth very large, terminal, oblique: lips thin, nearly smooth.

CHASMISTES, 6.

gg. Mouth inferior, moderate or small, with thick, papillose lips.

CATOSTOMUS, 7.

ff. Fontanelle obliterated by the union of the parietal bones: mouth small, inferior, with thick, papillose lips, the lower jaw provided with a cartilaginous sheath.....PANTOSTEUS, 8.

** Dorsal fin elongate, more or less elevated in front, of about 25 or more developed rays: air bladder in two parts.

† Fontanelle obliterated by the union of the parietal bones: head short and small: body elongate. (*Cycleptinæ.*)

h. Mouth small, inferior, with very thick, papillose lips: scales small, 55 to 60 in the course of the lateral line ..... CYCLEPTUS, 9.

†† Fontanelle well developed: head large: body oblong or ovate: scales large, 35 to 45 in the course of the lateral line. (*Bubalichthyinæ.*)

i. Dorsal rays in moderate number (24 to 33).

j. Mouth comparatively small, inferior, protractile downwards.

k. Pharyngeal bones narrow, with the teeth comparatively thin and weak. CARPIODES, 10.

kk. Pharyngeal bones strong, the teeth comparatively coarse and large, increasing in size downwards ..... BUBALICHTHYS, 11.

jj. Mouth quite large, terminal, protractile forwards: pharyngeal bones and teeth moderate: lips thin, nearly smooth ..... ICHTHYOBUS, 12.

ii. Dorsal fin very long, of about 50 developed rays ..... MYXOCYPRINUS, 13

Genus QUASSILABIA *Jordan & Brayton.*

Lagochila JORDAN & BRAYTON, Proc. Ac. Nat. Sc. Phila. 280. 1877. (Preoccupied in conchology as *Lagochilus.*)

Quassilabia (JORDAN & BRAYTON) JORDAN, Man. Vert. E. U. S. ed. 2d, 401, 1878.

Type, *Lagochila lacera* Jordan & Brayton.

Etymology, *quassus*, broken or torn; *labia*, lip.

Suckers like *Myxostoma* in every respect excepting the structure of the mouth and opercula. Head shortish, conical, with lengthened snout; its length 4½ to 5 times in that of the body, the opercular region being reduced, so that the eye is well backwards: suborbital bones narrow: fontanelle large, widely open. Mouth large, singular in structure, inferior, the upper lip not protractile, greatly prolonged, closely plicate. Lower lip much reduced, divided into two distinct elongate lobes, which are weakly papillose. The split between these lobes extends backwards to the edge of the dentary bones, which are provided with a rather hard, horny plate, as in *Pantosteus.* The lower lip is entirely separated from the upper at the angles by a deep fissure. The skin of the cheeks forms a sort of cloak over this fissure, the crease separating this skin from the mouth extending up on the sides of the muzzle. The crease between the lips extends down on the under side of the head. System of muciferous tubes well developed.

Pharyngeal bones not dissimilar from the usual type in *Myxostoma*, rather weak, with numerous small teeth.

Body elongate, not much compressed, not elevated. Fins moderate, of precisely the type usual in *Myxostoma.*

Scales large, precisely as in *Myxostoma*, the lateral line well developed and nearly straight, with about 45 scales in its course.

Air-bladder in three parts.

Sexual peculiarities unknown; probably little marked.

But a single species of this genus is known. It is a sort of offshoot from the genus *Myxostoma*, but its non-protractile mouth and singular lower lip would seem to indicate some real affinity with the genus *Exoglossum*.

The name *Lagochilus* had been previously applied to a genus of Gasteropods by Blanford, and to a genus of Insects by Loew. As *Lagochila* is substantially the same word, with the same etymology, and as, if written in strict correctness, it would be *Lagochilus* also, its authors have seen fit to substitute the name *Quassilabia*, and thus to forestall all discussion as to whether the name *Lagochila* should be retained. As this substitution was made soon after the original description of the genus, and before the name *Lagochila* had come into any general use, it is to be hoped that it will be accepted by succeeding ichthyologists.

Generic Characterizations.

LAGOCHILA Jordan & Brayton, 1877.—"Similar to *Myxostoma* (*Ptychostomus* Agassiz) except in the structure of the mouth parts. Dorsal fin short; lateral line well developed; scales large, subequal; air-bladder in three parts; fontanelle between parietal bones well developed; pharyngeal bones weak, with numerous small teeth; upper lip not all protractile, greatly enlarged, but attenuated, and singular in form. It consists of two elongated and narrow lobes, separated by a narrow, deep fissure, which extends inward to the edge of the mandible proper, which seems to be armed with a rather hard or almost horny plate, about as in the genus *Pantosteus*. The two lobes of the lip are weakly papillose. The lower lip is entirely separated from the upper at the angles by a deep fissure. Over this fissure the skin of the cheek lies as a sort of cloak; the crease separating this skin from the mouth, extending up on the sides of the muzzle. The fissure between the lips extends down on the skin of the under side of the head. The opercle is extremely short and the eye is entirely in the posterior part of the head."—(JORDAN & BRAYTON, *Proc. Ac. Nat. Sc. Phila.* p. 280, 1877.)

QUASSILABIA Jordan & Brayton, 1878.—"When the name *Lagochila* was first proposed for this genus, its authors were not aware that the masculine form, *Lagochilus*, had been already given to two different genera, to one of Gasteropods by Blanford, and to one of Insects by Loew. The words *Lagochila* and *Lagochilus* are identical in etymology and in all except terminations, and many writers would consider them insufficiently distinct, and would hold that the name *Lagochila* should be changed. At present, I am inclined to the contrary opinion; nevertheless, as the matter stands, and as the name *Lagochila* has not yet come into general use, less confusion perhaps will result from renaming the genus, than from any other course. The name *Quassilabia* (Jordan & Brayton) is accordingly suggested as a substitute for *Lagochila*, considered to be preoccupied in conchology. The etymology is *quassus*, broken or torn; *labia*, lip.

The case is precisely like that of the genus of Doves, *Leptoptila* Swainson, lately named *Æchmoptila* by Dr. Coues, on account of the previous *Leptoptilus* of Lesson."—(JORDAN, *Bull. U. S. Geol. Surv. Terr.* vol iv, No. 2, p. 418, 1878.)

ANALYSIS OF SPECIES OF QUASSILABIA.

*Head short, conical, with lengthened snout, the region between the eyes flattened and with prominent mucous ridges: cheeks and lower part of head rather swollen: opercle much reduced, its greatest length scarcely greater than the diameter of the eye: head about 4¼ in length: eye 4½ in length of head, about 2 in length of the snout, its situation thus quite posterior; length of the top of the head 1¼ in the distance from the snout to the base of the dorsal. Body rather slender, the form being between that of *Myxostoma cervinum* and *M. macrolepidotum*, the depth 4¼ in the length. Dorsal fin rather low; its rays I, 12; A. I, 7; V. 9. Scales 5–45–5. Color olive or bluish-brown above; sides and belly silvery; lower fins faintly orange...LACERA, 1.

1. QUASSILABIA LACERA *Jordan & Brayton.*

Hare-lip Sucker. Split-mouth Sucker. May Sucker of the Scioto. Cut-lips.

1877—*Lagochila lacera* JORDAN & BRAYTON, Proc. Ac. Nat. Sc. Phila. 280, 1877.
Lagochila lacera JORDAN, Man. Vert. ed. 2d, 511, 1878.
Quassilabia lacera JORDAN, Man. Vert. ed. 2d, 406, 1878.
Quassilabia lacera JORDAN, Bull. U. S. Geol. Surv. Terr. 418, 1878.

HABITAT.—Tennessee River. Scioto River.

Only three specimens of this singular Sucker are yet known. Two of these were taken by Professor Brayton and myself in the Chickamauga River at Ringgold, Catoosa County, Georgia, and the other in Elk River near Estill Springs, Tennessee. In both these streams, the species was well known to the fishermen, who said that it is one of the most abundant species in those waters, and one of the most highly valued for food. In the Chickamauga, it is known as the Hare-lip or Split-mouth Sucker None of the specimens taken were mature, the largest being but ten inches long, so that its maximum size cannot be given.

Since the above was written, a fine large specimen has been sent to me by J. H. Klippart, Esq., of the Ohio Fish Commission. It was taken in Scioto River near Columbus, in April, 1878. Mr. Klippart informs me that the species is well known to the Scioto fishermen, who call it May Sucker, as it runs up the river in May. That so strongly marked a species has so long escaped the attention of ichthyologists in the State of Ohio is singular.

Specimens in United States National Museum.

Number.	Locality.	Collector.
—	Chickamauga River	D. S. Jordan.

Genus PLACOPHARYNX *Cope.*

Placopharynx COPE, Proc. Am. Philos. Soc. Phila. 467, 1870.

Type, ***Placopharynx carinatus*** Cope.

Etymology, *πλὰξ*, a broad surface; *φάρυγξ*, pharynx.

Suckers like *Myxostoma* in all respects, except that the pharyngeal bones are much more developed, and the teeth reduced in number, those on the lower half of the bone very large, 6 to 10 in number, nearly cylindric in form, being but little compressed, and with a broad, rounded or flattened grinding surface. The forms and positions of these enlarged teeth vary greatly. In a specimen before me, the first tooth is the highest and most compressed, its summit being rounded and then abruptly truncate. The second tooth is notably shorter and thicker, much larger, and rounded on top, the body of the tooth serving as a peduncle for the swollen grinding surface. The third tooth is still shorter and similar in form. The fourth tooth is similar to the first, being much higher than the second and third, and flat on top. The others seem to be irregularly alternated or arranged in pairs, a long one and a short one, the long teeth in all cases being the most truncated, as if their surfaces had been most worn off.

As I have at present no perfect specimens of this genus, nothing but very young specimens, and pharyngeal jaws of adults, I cannot do better than to copy Professor Cope's original description, which seems to be an accurate one. I substitute the generic names used in this paper (*Myxostoma*, etc.) for those used by Professor Cope (*Ptychostomus*, etc.), whenever a difference occurs:—

"Allied to *Myxostoma*. The pharyngeal teeth much reduced in number, only seven on the proximal half of the bone, cylindric in form, with a broad, truncate triturating surface. These play against a broad, crescentic, chitin-like shield on the posterior roof of the pharyngeal cavity. Three divisions of the *vesica natatoria*.

"With a great superficial resemblance to *Myxostoma*, the masticatory apparatus is different from that of any Catostomoid form known to me, and combines peculiarities observed in some forms of true *Cyprinidæ*. The chitin-like shield is found in some of the latter; it is represented in *Catostomus*, *Myxostoma*, and *Carpiodes* by a narrow and very thin pellicle of the same material, frequently interrupted in the middle line."

But one species of the genus is known. It is apparently widely distributed through the Mississippi Valley and the Great Lakes, but its

peculiarities are rarely noticed unless the pharyngeal teeth are exposed. The writer has obtained four sets of the pharyngeal jaws and one entire skeleton, but has seen only two small specimens, collected by Professor Brayton in the Illinois River, and has obtained none in life.

Since the foregoing was written, I have collected numerous large specimens in the French Broad River, North Carolina, where it is the most abundant member of the family, known to all fishermen as the "Red Horse". With a great superficial resemblance to the Northern Red Horse (*Myxostoma macrolepidotum*), *Placopharynx carinatus* differs from all the species of *Myxostoma* in its larger and more oblique mouth and extremely thick lips.

2. PLACOPHARYNX CARINATUS *Cope.*

Big-jawed Sucker.

1870—*Placopharynx carinatus* COPE, Proc. Am. Philos. Soc. Phila. 467, 1870.
Placopharynx carinatus JORDAN, Fishes of Ind. 221, 1875. (Name only.)
Placopharynx carinatus JORDAN, Man. Vert. 296, 1876.
Placopharynx carinatus NELSON, Bull. No. 1, Ills. Mus. Nat. Hist. 49, 1876.
Placopharynx carinatus JORDAN & COPELAND, Check List, 158, 1876. (Name only.)
Placopharynx carinatus JORDAN, Proc. Ac. Nat. Sc. Phila. 72, 1877.
Placopharynx carinatus JORDAN & GILBERT, in Klippart's Rept. 53, 1877. (Name only.)
Placopharynx carinatus KLIPPART, First Report Ohio Fish Commission, 86, 1877.
Placopharynx carinatus JORDAN, Bull. U. S. Nat. Mus. ix, 50, 1877. (Name only.)
Placopharynx carinatus JORDAN, Man. Vert. ed. 2d, 311, 1878.
Placopharynx carinatus JORDAN, Bull. U. S. Geol. Surv. vol. iv, No. 2, p. 417, 1878.

HABITAT.—Mississippi Valley and Upper Great Lakes. Wabash River (*Cope, Jordan*). Scioto River. Ohio River. Detroit River. Illinois River. French Broad River.

The following is Professor Cope's description of this species:—

"The physiognomy and proportions of this sucker are those of the *Pt. erythrurus* or the 'red horse' of the Western Rivers.

"The lips are large and plicate, the anterior pendent like that of the *P. collapsus*, the posterior full like that of *Pt. cervinus*. Muzzle vertically truncate. Length of head in that of body four times; depth of body in same 3.66 times; scales 6—41—5. Radii D. XIV, V. 9, A. 7. Free margin of dorsal straight, not elevated anteriorly. Occipital region more elevated medially than in *Pt. erythrurus*, superior ridges well marked, with a special addition characteristic of this species, and of none other with which I am acquainted. This is a median longitudinal frontal ridge, extending from the fontanelle to between the nasal ridges. Only

the posterior extremity of this ridge appears in some *Ptychostomi*. Orbit longitudinally oval, 4.5 times in length of head, twice in interorbital width. Type, fourteen inches in length.'

"Color in alcohol like that of other species, uniform straw or whitish silvery.

"The pharyngeal bones of this species are much stouter than those of other species of its own and greater size, *e. g.*, *Pt. aureolus* of eighteen inches, where they are comparatively slight. The exteroposterior ala is twice as wide as the body inside the teeth is deep, and but for its short base and narrowed tip would do for that of a Semotilus. But while there are seven broad teeth without heel or cusp on the basal half, there are at least forty on the distal half, they becoming more compressed and finally like those of other allied genera. There are fourteen with truncate extremities. The pharyngeal plate has narrow horns directed upwards and forwards, and is thickened medially. It is placed immediately in advance of the opening of the œsophagus. I have but one specimen of this curious species, which I obtained at Lafayette, on the Wabash River, in Indiana."

The writer has in his collection two young specimens obtained in Illinois River by Prof. Brayton, a skeleton of a very large individual found in Scioto River by Dr. J. W. Wheaton, and a pair of pharyngeal bones taken by Dr. G. M. Levette from a fish taken in the Wabash at Terre Haute. I have also seen a pair of pharyngeals and an air-bladder of one taken in Detroit River by Professor Baird, and now in the United States National Museum, and a jaw from "Post-pliocene" deposits near the Falls of the Ohio, found by Dr. John Sloan. The jaws and air-bladder above noticed are the only specimens of this species preserved in the National Museum.

Since the foregoing was written, the writer has obtained numerous living specimens of *Placopharynx carinatus* from the French Broad at Wolf Creek and other localities in North Carolina. From one of these, the following description was taken :—

Body oblong, moderately compressed, heavy at the shoulders: head very large, $3\frac{2}{3}$ in length of the body: eye small, behind the middle of the head: mouth extremely large, the lower jaw oblique when the mouth is closed, the mouth, therefore, protractile forwards as well as downwards: lips very thick, coarsely plicate, the lower lip full and heavy, truncate behind: head above evenly rounded, in my specimens not showing the carination described by Professor Cope: scales 6–45–6: dorsal rays 13; ventral 9: color brassy-green above; lower fins red.

Genus MYXOSTOMA (*Rafinesque*) *Jordan.*

Catostomus sp. LE SUEUR, and of all writers till 1855.

Moxostoma RAFINESQUE, Ichthyologia Ohiensis, 1820, 54. (Proposed as a subgenus for those species of *Catostomus* with eight ventral rays and the caudal lobes unequal: type *C. anisurus* Raf.)

Teretulus RAFINESQUE, Ichthyologia Ohiensis, 1820, 57. (As a subgenus, to include those species of *Catostomus* with nine ventral rays: no type designated—most of the species recorded belong to the present genus. *C. aureolus* Le Sueur is the species first mentioned, and to this species and its relatives the name *Teretulus* was afterwards restricted by Professor Cope.)

Ptychostomus AGASSIZ, American Journal of Science and Arts, 1855, p. 203. (No type designated: the species mentioned are *P. aureolus*, *P. macrolepidotus*, *P. duquesnii*, and *P. melanops*. *P. aureolus* has been considered the type of the genus.)

Teretulus COPE, Journ. Ac. Nat. Sc. Phila. 1868, 236.

Moxostoma JORDAN, Manual of Vertebrates, 1876, 295.

Myxostoma JORDAN, Ann. Lyc. Nat. Hist. 1877, 348. (Corrected orthography.)

Etymology, *μύξω*, to suck; *στόμα*, mouth.

Type, *Catostomus anisurus* Rafinesque.

Body more or less elongate, sometimes nearly terete, usually more or less compressed.

Head variously long or short, its length ranging from 3½ to 5½ in that of the body: eye usually rather large, varying from 3 to 6 times in the length of the side of the head, its position high up and median or rather posterior: suborbital bones very narrow, always much longer than broad, their width less than one-fourth that of the fleshy part of the cheek: fontanelle on top of head always well open, the parietal bones not coalescing.

Mouth varying much in size, always inferior in position, the mandible being horizontal or nearly so: lips usually well developed, the form of the lower varying in different sections of the genus, usually with a slight median fissure, but never deeply incised; the lips with transverse plicæ—the folds rarely so broken up as to form papillæ: jaws without conspicuous cartilaginous sheath: muciferous system considerably developed, a chain of tubes along the supraorbital region, a branch of which extends around behind the eye and forwards along the suborbital bones and the lower edge of the preorbital: opercular bones moderately developed, nearly smooth: isthmus broad: gill-rakers weak, moderately long, in length about half the diameter of the eye.

Pharyngeal bones rather weak, much as in *Erimyzon* and *Catostomus*,

the teeth rather coarser, strongly compressed, the lower five or six much stronger than the others, which are rapidly diminished in size upwards, each with a prominent internal cusp.

Scales large, more or less quadrate in form, nearly equal in size over the body, and not specially crowded anywhere, usually about 44 in the lateral line (41 to 56), and about twelve series between dorsal and ventrals. Lateral line well developed, straight or anteriorly decurved.

Fins well developed, the dorsal inserted about midway of the body, its first rays usually rather nearer snout than the caudal, the number of developed rays usually about 13, but varying in different species from 11 to 17: anal fin short and high, usually emarginate in the male fish, probably always with seven developed rays: ventrals inserted nearly under the middle of the dorsal; their number of rays normally 9, occasionally varying to 10; the occurrence of ten ventral rays is probably an accidental individual character, and not a permanent specific one: caudal fin deeply forked, the lobes about equal, except in two species.

Air-bladder with three chambers: skeleton essentially as in *Catostomus*, the vertebræ in *M. carpio* 27–14 (Günther).

Sexual peculiarities little marked, the males in the spawning season with the lower fins reddened, and the anal rays swollen and somewhat tuberculate.

This genus is widely diffused, some of its species occurring in all the waters of the United States east of the Rocky Mountains, excepting those of the New England States. Some of the more aberrant species seem to be quite local; other species are of the widest distribution. The principal species in the genus, although not the technical type, *M. macrolepidotum*, is very widely diffused, and is subject to much variation.

This genus is one readily recognizable by external appearance, its species being known to the fishermen as "*Red Horse*" and "*Mullet*"; those of other genera being called rather "Suckers". Its proper nomenclature has, however, been a subject of considerable uncertainty.

The subgenus *Moxostoma* was originally proposed by Rafinesque to include *C. anisurus* Raf., with the following diagnosis:—"Body oblong, compressed; head compressed, eight abdominal rays; dorsal fin commonly longitudinal; tail commonly unequally forked."

The characters here noticed are either common to several genera, or else merely specific, and the use of the generic name must depend on our identification of the original typical species. By some

process of reasoning not now explainable, Professor Agassiz identified this with the common Chub Sucker of the West, a species which I consider identical with *Cyprinus oblongus* Mitchill. He thus transferred the name *Moxostoma* from the "Red Horse" to the "Chub Sucker" group. Rafinesque's description, however, renders it evident that his fish was one of the Red Horse kind; and as *Moxostoma* is the first generic name applied to species of that group, it must be retained in spite of the incompleteness of the original diagnosis.

Teretulus Rafinesque was proposed three pages later for "an extensive subgenus, to which belong all the following species of Le Sueur: *C. aureolus*, *C. macrolepidotus*, *C. longirostrum*, *C. nigricans*, *C. vittatus*, *C. maculosus*, *C. sucetta*, besides the *C. teres* and *C. oblongus* of Mitchill." To these he adds his own species, *C. melanops*, *C. melanotus* (= *Campostoma*), *C. fasciolaris*, *C. erythrurus*, and *C. flexuosus*. This "*omnium gatherum*" receives the following diagnosis:—"Body elongate cylindrical or somewhat quadrangular, 9 abdominal rays, dorsal fin commonly small, tail equally forked."

A name proposed for a group of this kind, in the opinion of the present writer, should not be set aside, but should be retained for some one or more of the species originally referred to it, and when any writer adopts such a genus, he shall have the right to select any of the species as its type, and the name should be considered thereafter as applying to such typical species only, not to be revived in case such typical species be afterwards found to have had a prior generic name. In case no such type has been selected by any author, then the "principle of exclusion" should be applied, and the name be retained for such species as may be left to the last, on subtracting from the mongrel group the different component genera in chronological order.

In this view, *Teretulus*, having been by Professor Cope, in 1868, restricted to *C. aureolus* Le S. and its affines, these being congeneric with species previously called *Moxostoma*, becomes a synonym of *Moxostoma*, and cannot be used for a distinct genus. The principle of exclusion, if unmodified, would require us to use the name *Teretulus* for those species left on subtracting *Catostomus* proper, *Moxostoma*, *Campostoma*, *Erimyzon*, and *Hypentelium*, *i. e.*, in place of *Minytrema*.

Ptychostomus Agassiz was proposed for this same group, without reference to the two names conferred by Rafinesque. This genus was well characterized by Professor Agassiz on the peculiarities of the scales

and lips, although the species of *Minytrema* was inadvertently included in it. The most important generic feature, the tricellular air-bladder, was first noticed by Professor Cope.

I have seen fit to change the orthography of the name from *Moxostoma* to ***Myxostoma***, in accordance with its apparent etymology. This change is rather desirable from the fact that it tends to avoid confusion, the name *Moxostoma* having been commonly used in connection with a different genus.

The genus *Myxostoma* contains two well-marked sections, typified respectively by *M. velatum* and *M. macrolepidotum*, and characterized by the form of the mouth and lower lip: that of *M. velata* being as in the genus ***Erimyzon;*** that of *M. macrolepidotum* being of the character most common in this genus.

Generic Characterizations.

MOXOSTOMA Rafinesque, 1820.—"Body oblong, compressed; head compressed, eight abdominal rays, dorsal fin commonly longitudinal; tail commonly unequally forked."—(*Ichthyologia Ohiensis*, p. 54.)

TERETULUS Rafinesque, 1820.—"Body elongate cylindrical or somewhat quadrangular, 9 abdominal rays, dorsal fins commonly small; tail equally forked. An extensive subgenus, to which belong all the following species of Le Sueur: *C. aureolus*, *C. macrolepidotus*, *C. longirostrum*, *C. nigricans*, *C. vittatus*, *C. maculosus*, *C. sucetta*, besides the *C. teres* and *C. oblongus* of Dr. Mitchill."—(*Ich. Oh.* p. 57.)

PTYCHOSTOMUS Agassiz, 1855.—"In respect to form of body and the structure and position of the fins, this genus does not differ from Catostomus proper, but may be distinguished by the following structural peculiarities. The lips are marked by transverse ridges or folds, and hardly bilobed below; they are not papillated as in Catostomus proper. The generic name of this type is derived from this character of the lips The head is shorter and stouter. The dorsal is longer than it is high, but in the males, it is longer in proportion than in the females. The anal of the male is also broader than that of the female, and its lower margin lobed, while in the female it is trapezoidal and narrow.

"The scales are as large on the anterior as on the posterior region of the body; their vertical diameter about as great as the longitudinal, so that the scales are nearly quadrangular, with rounded edges; the ornamental concentric ridges not longer nor broader upon the posterior than upon the lateral and anterior fields; the radiating furrows few, only one or two in the posterior field and one on each side limiting that field from the lateral fields; those of the anterior field are more numerous, and yet not crowded. Tube of the lateral line arising in the centre of radiation or farther back upon the posterior field.

"The pharyngeals are strong, their entire edge spreading like a wing, and that spreading margin is separated from the symphysis by a deep emargination. The teeth increasing rather rapidly in size from above downwards, are more apart from one

another than in the preceding genera, and arched inward as in Moxostoma, the inner edge of the lower ones square, its inner margin rising into a broad cusp in the middle and upper teeth."—(*American Journ. Sci. Arts*, xix, p. 203.)

TERETULUS Cope, 1868.—"The essential character of this genus is the division of the natatory bladder into three chambers, while Catostomus and all Cyprinidæ, exhibit but two. This feature is accompanied by plicate lips, as Agassiz has indicated, and nine rays to the ventral fin, already pointed out by Rafinesque. The species are the largest scaled of the typical suckers. Le Sueur and Valenciennes have pointed out the generic features in the *P. macrolepidotus;* Prof. Baird informs me that it occurs in *Pt. florealis* Bd., and I find it in *Pt. cervinus* and *Pt. duquesnii*. It no doubt exists also in the *Pt. aureolus*. Other species described by Baird and Girard from the Southwest probably possess it.

"It is difficult to assign a name to this genus. Rafinesque proposes it upon untenable characters, and includes with it species of Moxostoma and Catostomus. Agassiz purged it of these elements, but did not express its essential character, apparently relying on the plicate lips. I have taken the older name, leaving for others the final decision."—(*Journal Acad. Nat. Sci. Phila.* 1868, p. 236.)

PTYCHOSTOMUS Cope, 1870.—"The development of the lips furnish important diagnostic indications in this genus. In those most nearly allied to Moxostoma, the inferior lip resembles that of that genus in being narrower and deeply incised, emarginate posteriorly forming a figure V with the apex forwards, at the same time the superior lip is very thin and often narrow. Such species are shorter, and tend to a great development of dorsal fin. Others of this type are more elongate. Some species of both are distinguished by their very prominent conic muzzle and minute, inferior mouth, reminding one of the Carpiodes. In one species the lips are papillose instead of plicate. In some species, the mouth is very projectile, in others scarcely so at all.

"Rafinesque proposed a genus *Teretulus* on the characteristic peculiarity of nine ventral radii, belonging to most species of this genus. He however included species of two other genera. On this account, Agassiz, in rearranging the suckers, imposed on it the name standing at the head of this article, regarding the plicate lips as a primary character. I think Rafinesque's name is to be rejected, owing to its ill application; the more as I find two species in which there are ten ventral radii. I adopt that of Agassiz, though I showed, when describing the *Pt. cervinus*, that the tricellular natatory bladder was a more distinctive feature. This becomes the more obvious now that I have found a species where the lips are tubercular instead of plicate."—(*Proc. Am. Philos. Soc. Phila.* p. 469.)

MOXOSTOMA Jordan, 1876.—"Dorsal moderate, of 11 to 20 rays: air bladder in three parts: lips usually plicate: lateral line very distinct: pharyngeal teeth numerous and all small, of the usual type, the bones slender" (in comparison with those of *Placopharynx*).—(*Man. Vert. E. U. S.* p. 292.)

MOXOSTOMA Cope & Jordan, 1877.—"Body oblong or elongate, with a short subquadrate dorsal fin of 10 to 17 developed rays: air bladder in three parts: lateral line present: fontanelle present: scales large, subequal: pharyngeal bones not especially enlarged, the teeth of the usual type."—(JORDAN, *Proc. Acad. Nat. Sci. Phila.* 1877, p. 81.)

ANALYSIS OF SPECIES OF MYXOSTOMA.

* Lips distinctly plicate.

† Lower lip full, its posterior edge truncate, not infolded and "∧-shaped".

a. Species with the body distinctly compressed, the depth 3¼ to nearly 5 in length.

b. Dorsal fin largely developed, its rays 15 to 18 in number: head rather large, 3¾ to 4¼ in length, broad above: mouth large, with full lips: eye rather large: body deep, strongly compressed, the back somewhat elevated, the depth about 3¼ in length: dorsal fin high and large, larger than in any other species of the genus, the first ray about as long as the base of the fin: scales 5–43–4, quite large: coloration very pale and silvery, the lower fins white ..... CARPIO, 3.

bb. Dorsal fin moderate, its rays 12 to 14 in number.

c. Scales large, 41 to 50 in the course of the lateral line.

d. Caudal fin normal, the two lobes about equal and similarly colored.

e. Head singular in form, much shortened, the muzzle very abruptly decurved, descending almost perpendicularly in front of the eye: the head wedge-shaped from behind forwards, and less so from below upwards, its sides subvertical and the lower cross-diameter of the head greater than the upper.

f. Eye very large, more than one-third the length of the side of the head (in an individual of six inches in length): lips thin, very faintly plicate: width of head through the opercles greater than the thickness of the body: head 4¼ in length; depth about the same: dorsal rays 13: scales 6–43–5: body shortish, closely compressed, the back somewhat elevated, and the caudal peduncle unusually long in proportion: color smoky-blue; lower fins white: size probably small ..... EURYOPS, 4.

ee. Head normal in form, not as above.

g. Mouth moderate or large, not very small, nor very much overpassed by the muzzle: lips thick, strongly plicate: body stoutish, varying to moderately elongate: dorsal fin medium, its developed rays 12 to 14, usually 13 in number: scales large, about 6–45–5: lower fins in the adult red or orange.

h. Head comparatively elongate, 4 to 5 in length: mouth large: size very large, reaching a length of two feet or more ..... MACROLEPIDOTUM, 5.

x. Head quite elongate, 4 to 4¾ in length: back little elevated: body rather elongate, not greatly compressed: scales pretty large, 6–42 to 49–5: back bluish or olive; sides brilliantly silvery, with bright reflections; dorsal fin dusky above; lower fins bright red ..... *duquesnii.*

xx. Head a little shorter, 4¼ to 4¾ in length: form of the preceding: scales distinctly smaller, 7 or 8–48 to 50–6: back with much smoky shading ..... *lachrymale.*

*Lips distinctly plicate—Continued.

xxx. Head still shorter and deeper, 4½ to 5 in length, its upper profile concurrent with the curve of the back, which is considerably elevated, the form being thus somewhat elliptical: sides compressed: dorsal rays usually 13: coloration little silvery, the sides reflecting brownish and golden; back smoky, some of the scales dusky at base: scales 6–42 to 50–5....*macrolepidotum.*

hh. Head comparatively short, low and small, 5 to 5½ in length; back elevated and compressed; depth 8½ in length: mouth rather small, more or less overpassed by the snout: coloration bright yellowish-brown, etc., not silvery; lower fins bright red: dorsal rays 13: scales 6–42 to 48–5: size large.

AUREOLUM, 6.

gg. Mouth very small, much overpassed by the conic muzzle: head small, about 5 in length.

i. Body flattish, the back elevated and compressed; depth 3½: muzzle contracted: scales large, 5–44–5: dorsal rays usually 12: dorsal fin elevated in front, its first soft ray longer than the base of the fin: color silvery, with smoky shading above, some of the scales blackish at their bases; lower fins white; top of head, humeral bar, and dorsal fin dusky.

CRASSILABRE, 7.

ii. Body flattish, the dorsal outline elevated, the form being like that of *M. coregonus:* head small and conic: mouth exceedingly small, the snout far overpassing it, the muzzle being much longer than in *M. crassilabre:* dorsal rays 14: eye large: coloration smoky above, some scales dusky at their bases; sides pale; lower fins white.....CONUS, 8.

dd. Caudal fin with the upper lobe falcate, much longer than the lower, at least in the adult, the lobes similarly colored: dorsal fin short and high, falcate: body compressed; back somewhat elevated; depth 3½ in length: head conic, flattish, 5½ in length: mouth very small, much as in *aureolum.* D. 12–13, half higher than long: scales 6–46–5.

ANISURA, 9.

ddd. Caudal fin with the lower lobe much longer than the upper and differently colored, the upper lobe in the adult being red, the inferior jet-black, its two lowermost developed rays and their membranes abruptly white (? in both sexes). Body elongate, moderately compressed, somewhat elevated forwards; depth 4½ in length: head about the same: mouth medium, the lips full: dorsal rays 13: scales large, 5–44–4: coloration usual, except of the caudal fin; other fins all red, with blackish shadings: size small.....POECILURA, 10.

*Lips distinctly plicate—Continued.

cc. Scales very small for the genus, about 9–56–8 in number: body moderately elongate, the depth about 4 in the length.

ee. Head shortish, conic, the snout not much projecting, about 4 in length: eye large: dorsal fin small, with about eleven rays, the last rapidly shortened (characters of mouth unknown, but probably similar to *macrolepidotum* and *pœcilura;* it is said to be "much larger than in *P. congestus*") ..... ALBIDUM, 11.

aa. Species with the body elongate, little compressed, broad, the depth about 5 in length, not very much greater than the thickness.

j. Head very short, roundish above, rather pointed forwards, about 5 in length: cheeks subvertical: mouth rather large, with thick lips, which are strongly plicate, the folds somewhat broken up: eye small: fins very small, the dorsal rays 10 to 12: scales rather large, 6–44 to 49–5: color greenish-brown, a pale blotch on each scale, these forming continuous streaks along the rows of scales: back with more or less distinct brownish cross-blotches; fins brownish, not much red; the dorsal blackish at tip: size smallest: length less than a foot ..... CERVINUM, 12.

††Lower lip thin, not infolded and "Λ-shaped", forming a narrow, crescent-shaped border around the mandible.

k. Head small, 5 times in length: muzzle prominent, but less so than in *M. coregonus:* mouth moderate: back a little elevated: depth about 3½ in length: dorsal rays 12 to 14, its free border often incised: scales 6–45–5: coloration very pale; lower fins white: size large; reaches a weight of four pounds or more..... ALBUM, 13.

kk. Head stout, as in *M. velatum*, rather long, 4 in length, flattish above, muzzle truncate, not very prominent: mouth moderate: back elevated: dorsal fin long, of 14 or 15 rays: sea-green above; white below; lower fins white ..... THALASSINUM, 14.

†††Lower lip infolded, Λ-shaped when viewed from below, with a distinct median crease, in which the two halves of the lip meet, forming an acute angle: mouth small.

l. Dorsal large, with 16 (15 to 17) developed rays.

m. Body stout, deep, compressed, the back elevated, the depth 3 to 4 in length: head short, heavy, flattish and broad above, thick through the cheeks, 3½ to 4½ in length: eye rather large, midway in head, 4 to 5 in its length: muzzle rather prominent, bluntish, overhanging the very small mouth: fins very large: dorsal long and high, its height five-sixths the length of the head: pectorals nearly reaching ventrals: color silvery, smoky above; lower fins red: size large ..... VELATUM, 15.

*Lips distinctly plicate—Continued.

ll. Dorsal moderate, with 12 to 14 developed rays.

n. Head comparatively large, about 4 in length: dorsal rays usually 12.

o. Head short and very wide through the opercles, flat above: body stout, the back somewhat elevated, depth 4 in length: muzzle subtruncate, slightly projecting: scales 6–40–5: olivaceous, silvery below; dorsal fin dusky.

CONGESTUM, 16.

oo. Head rather long, 4¼ in length, flattish above: body elongate, more nearly cylindrical, little compressed: muzzle truncate: olivaceous, sometimes with rows of faint spots along the series of scales; dorsal and caudal fins black-edged: size quite small: resembles *M. cervinum*, but the mouth entirely different ..... PIDIENSE, 17.

nn. Head very small, about 5 in length: muzzle conic, much projecting beyond the very small mouth; body broadly fusiform, much compressed, the back elevated and arched: dorsal rays 14: color silvery, with plumbeous shades above; lower fins white: size small ..... COREGONUS, 18.

** Lips full, strongly papillose, much as in the subgenus *Hypentelium*.

p. Body comparatively stout, the dorsal region somewhat elevated and rounded, the depth being about 4 in length, the head about the same: eye rather large, high up and well back, the preorbital space being longer than in the other species: top of head flat: dorsal rays 12 to 14: scales rather large, 6–42–5: lips well developed, deeply incised: color silvery; back with smoky shading; lower fins white: size large, reaches a length of about two feet

PAPILLOSUM, 19.

3. MYXOSTOMA CARPIO (*Valenciennes*) *Jordan.*

Carp Mullet. White Lake Mullet.

1844—*Catostomus carpio* VALENCIENNES, Cuv. et Val. Hist. Nat. des Poiss. xvii, 457, pl. 517.

Catostomus carpio STORER, Synopsis, 426, 1846.

Catostomus carpio GÜNTHER, Cat. Fishes Brit. Mus. vii, 20, 1868.

Ptychostomus carpio COPE, Proc. Am. Philos. Soc. Phila. 476, 1870.

Ptychostomus carpio JORDAN, Fishes of Ind. 221, 1875. (Name only.)

Moxostoma carpio JORDAN, Man. Vert. 296, 1876.

Teretulus carpio NELSON, Bull. No. 1, Ills. Mus. Nat. Hist. 49, 1876.

Teretulus carpio JORDAN & COPELAND, Check List, 157, 1876. (Name only.)

Moxostoma carpio JORDAN & GILBERT, in Klippart's Rept. Fish Comm. Ohio, 53, 1877. (Name only.)

Myxostoma carpio JORDAN, Man. Vert. E. U. S. ed. 2d, 312, 1878.

HABITAT.—Great Lake Region and northward. Also in the Ohio River.

This species is apparently not very common, and its distribution is probably chiefly northward. I have obtained but one living specimen, a fine large one, from Lac des Buttes des Morts, in Northeastern Wisconsin. This specimen in life was extremely pale and silvery, its fins having none of the orange coloration common to most of the species. *M. carpio* is related to *M. macrolepidotum*, but the much greater development of the dorsal will always distinguish it.

Specimens in United States National Museum.

Number.	Locality.	Collector.
10793	Cincinnati, Ohio	J. W. Milner.
11214	Alpena, Mich. (Lake Huron)	J. W. Milner.
12270	Cincinnati, Ohio	J. W. Milner.
12271	Cincinnati, Ohio	J. W. Milner.
12293	Cincinnati, Ohio	J. W. Milner.
—	Marietta, Ohio	Prof. Andrews.

4. MYXOSTOMA EURYOPS *Jordan.*

Snub-nosed Sucker.

1876—*Teretulus euryops* JORDAN & COPELAND, Check List, 157. (Name only.)

Myxostoma euryops JORDAN, Ann. Lyc. Nat. Hist. N. Y. xi. 348, 1877.

Myxostoma euryops JORDAN, Man. Vert. ed. 2d, 312, 1878.

HABITAT.—Alabama River.

This species is still known only from the type-specimen obtained in Lovejoy's Creek, a small tributary of Oostanaula River, a few miles north of Rome, Ga. The species is most nearly related to *M. macrolepidotum*, and it is barely possible that the type-specimen is a monstrosity of that species. The peculiarities of the mouth, and the fact that the bones of the head seem to be normally developed, lead me to consider it a distinct species.

5. MYXOSTOMA MACROLEPIDOTUM (*Le Sueur*) *Jordan.*

Common Red Horse. Mullet. White Sucker. Large-scaled Sucker.

a. Subspecies *macrolepidotum.*

1817—*Catostomus macrolepidotus* LE SUEUR, Journ. Ac. Nat. Sc. Phila. i, 94.
Catostomus macrolepidotus DEKAY, New York Fauna, part iv, Fishes, 202, 1842.
Catostomus macrolepidotus CUVIER & VALENCIENNES, Hist. Nat. des Poissons, xvii, 447, 1844.
Catostomus macrolepidotus STORER, Synopsis, 420, 1846.
Ptychostomus macrolepidotus AGASSIZ, Am. Journ. Sci. Arts, 2d series, xix, 204, 1855.
Ptychostomus macrolepidotus COPE, Proc. Am. Philos. Soc. Phila. 475, 1870.
Ptychostomus macrolepidotus JORDAN, Fishes of Ind. 221, 1875. (Name only.)
Moxostoma macrolepidotum JORDAN, Man. Vert. 296, 1876.
Teretulus macrolepidotum NELSON, Bull. No. 1, Ills. Mus. Nat. Hist. 49, 1876.
Catostomus macrolepidotus UHLER & LUGGER, Fishes of Maryland, 140, 1876.
Teretulus macrolepidotus JORDAN & COPELAND, Check List; x, 157, 1876. (Name only.)
Moxostoma macrolepidota JORDAN & GILBERT, in Klippart's Rept. 53, 1876. (Name only.)
Myxostoma macrolepidota JORDAN, Man. Vert. E. U. S. ed. 2d, 313, 1878.

1842—*Catostomus oneida* DEKAY, New York Fauna, part iv, Fishes, 198.
Catostomus oneida STORER, Synopsis, 425, 1846.
Ptychostomus oneida COPE, Proc. Am. Philos. Soc. Phila. 476, 1870.

1870—*Ptychostomus robustus* COPE, Proc. Am. Philos. Soc. Phila. 473.
Teretulus robustus JORDAN & COPELAND, Check List, 157, 1876. (Name only.)

1876—*Ptychostomus congestus* COPE & YARROW, Lieutenant Wheeler's Expl. W. 100th Mer. v, 680, 1876. (Not of Girard.)

HABITAT.—North Carolina to Vermont, and northwestward through the Great Lake Region and the Upper Mississippi—the only form of the species occurring east of the Alleghany Mountains. (Also in Arizona?)

b. Subspecies *lachrymale* (Cope) Jordan.

1870—*Ptychostomus lachrymalis* COPE, Proc. Am. Philos. Soc. Phila. 474.
Teretulus lachrymalis JORDAN & COPELAND, Check List, 157, 1876. (Name only.)
Myxostoma duquesnii var. *lachrymalis* JORDAN, Ann. Lyc. Nat. Hist. N. Y. xi, 349, 1877.
Myxostoma macrolepidota var. *lachrymalis* JORDAN, Man. Vert. ed. 2d, 313, 1878.

HABITAT.—North Carolina to Alabama.

c. Subspecies *duquesnei* (Le Sueur) Jordan.

1817—*Catostomus duquesnii* LE SUEUR, Journ. Ac. Nat. Sc. Phila. 105.
Catostomus duquesnii RAFINESQUE, Ich. Oh. 60, 1820.
Catostomus duquesnii KIRTLAND, Rept. Zool. Ohio, 168, 1838.
Catostomus duquesnii DEKAY, New York Fauna, part iv, Fishes, 203, 1842.

Catostomus duquesnii CUVIER & VALENCIENNES, Hist. Nat. des Poissons, xvii, 458, 1844.

Catostomus duquesnii KIRTLAND, Boston Journ. Nat. Hist. v, 268, 1845.

Catostomus duquesnii STORER, Synopsis, 423, 1846.

Ptychostomus duquesnii AGASSIZ, Am. Journ. Sc. Arts, 2d series, xix, 204, 1855.

Catostomus duquesnii GÜNTHER, Cat. Fishes Brit. Mus. vii, 18, 1868.

Teretulus duquesnei COPE, Journ. Ac. Nat. Sc. Phila. 236, 1868.

Ptychostomus duquesni COPE, Proc. Am. Philos. Soc. Phila. 476, 1870.

Ptychostomus duquesnei JORDAN, Bull. Buffalo Soc. Nat. Hist. 95, 1876.

Moxostoma duquesnii JORDAN, Man. Vert. 295, 1876.

Catostomus duquesnii UHLER & LUGGER, Fishes of Maryland, 139, 1876.

Teretulus duquesnii NELSON, Bull. No. 1, Ills. Mus. Nat. Hist. 49, 1876.

Teretulus duquesnii JORDAN & COPELAND, Check List, 157, 1876. (Name only.)

Moxostoma duquesnei JORDAN & GILBERT, in Klippart's Rept. 53, 1876. (Name only.)

Myxostoma duquesnii JORDAN, Ann. Lyc. Nat. Hist. N. Y. xi, 349, 1877.

Myxostoma duquesnii JORDAN, Bull. U. S. Nat. Mus. ix, 37, 1877.

Myxostoma macrolepidota var. *duquesni* JORDAN, Man. Vert. ed. 2d, p. 313, 1878.

1818—*Catostomus erythrurus*, RAFINESQUE, Am. Month. Mag. and Crit. Rev. 354.

Catostomus erythrurus RAFINESQUE, Ich. Oh. 59, 1820.

Catostomus erythrurus KIRTLAND, Rept. Zool. Ohio, 168, 1838.

Ptychostomus erythrurus COPE, Proc. Am. Philos. Soc. Phila. 474, 1870.

Ptychostomus erythrurus JORDAN, Fishes of Ind. 221, 1875. (Name only.)

Teretulus erythrurus JORDAN & COPELAND, Check List, 157, 1876. (Name only.)

1820—*Rutilus melanurus* RAFINESQUE, Ich. Oh. 51.

HABITAT.—Ohio Valley. Upper Mississippi River and southward; most abundant from Wisconsin to Georgia.

Examination of a very large series of "Mullet" and "Red Horse" from various parts of the country has led me to the conclusion, at first rather unexpected, that all the various forms included in the above synonymy belong to one widely diffused and somewhat variable species.

The "Mullet" of the lakes and of Eastern Pennsylvania appears generally to differ in the more elevated and compressed body, shorter, deeper head, and brownish or brassy rather than silvery coloration. This represents the general tendency of "var. *macrolepidotum*"; but specimens of "*duquesnei*" can be found which will match the average *macrolepidotum* in each of these respects. The form which I have identified with Professor Cope's *lachrymale* is to some extent intermediate, but has the additional peculiarity of smaller scales. In this respect, however, occasional individuals, both of *duquesnei* and of *macrolepidotum*, can be found which approach it.

The form inhabiting the waters of the eastern and northern parts of the United States is the variety *macrolepidotum*. It is sold commonly as a food-

fish in the winter and spring in the markets of Washington and Philadelphia, as well as in the markets of those cities in the West which are supplied by the fisheries of the Great Lakes. It is probably much more abundant in Lake Erie than *M. aureolum* is, and it has been frequently confounded with the latter species. I once obtained two specimens, each of nearly twelve pounds weight, in the Fox River in Wisconsin.

In the Ohio River and its tributaries, and in the rivers of the Southwest generally, the var. *duquesnii* is the prevailing form. This variety is more delicately colored than the other, the silvery lustre of the scales is more strongly marked, and the red of the fins is rather more vivid. This form, too, is valued somewhat as a food-fish, although the flesh, like that of all the Suckers, is comparatively coarse, tasteless, and full of bones. The variety *duquesnei* is everywhere known by the curious vernacular name of "Red Horse", a name possibly to be accounted for by the color of the fins and the form of the head. This variety also grows to a large size.

The variety *lachrymale* I only know from specimens obtained in Etowah River, Georgia, in company with the variety *duquesnei*. Nothing distinctive was noticed in regard to its habits.

The Red Horse prefer rather deep, clear water, seldom ascending very small streams, and then chiefly in the spawning season—in May—at which time they may be found in great abundance in any rapid of a river or a creek, or below a mill-pond. They are generally caught by nets, traps, or snares, but will frequently bite at a hook baited with a worm.

In the confinement of an aquarium, the Red Horse are not very hardy. Foul water kills them at once.

Synonyms.—The earliest name given to a Red Horse is that of *Catostomus macrolepidotus* Le Sueur. The specific name *macrolepidotus* must therefore be retained for this species. The specific name *oneida*, given by DeKay to an individual from Oneida Lake, New York, doubtless belongs here, as the var. *macrolepidotum* is the only member of this genus known to inhabit that part of New York, and there are no serious discrepancies in the rather poor description.

Ptychostomus robustus Cope may possibly be different; but as its describer has failed to note any distinctive characters which I consider likely to be permanent, I am compelled to refer it here. It is from Yadkin River in North Carolina. A *Ptychostomus congestus* is described by Cope and Yarrow from Arizona. It is probably not Girard's species of

that name, and I am unable to distinguish it from typical *macrolepidotum*, although the mouth is rather small, more like that of *aureolum*.

I have identified certain specimens with Professor Cope's *P. lachrymale* with a little doubt, as the points of differentiation which I notice are not those emphasized by Professor Cope. The original types, which I believe are now lost, were from the Neuse River in North Carolina. In describing this species, Professor Cope remarks, "This species is quite near the last (*P. erythrurus*) and may at some future time be shown to be a local variety of it, but in this case *P. macrolepidotus* must follow also."

The synonyms of var. *duquesnei* may now be noticed. Of these, the only one of importance is that of *Catostomus erythrurus* Rafinesque, recently recognized by Professor Cope as a species distinct from *P. duquesnii*.

The presence of ten ventral rays in *duquesnii*, as contrasted with nine ventral rays in *erythrurus*, is the chief point on which Professor Cope relies to distinguish the two species. He also finds the mouth rather more inferior in *duquesnii*, and the scales rather smaller, 7–48–7, instead of 5–42–4.

In regard to the number of ventral rays, my experience is that in every species of the genus the normal number is *nine*, but that ten-rayed individuals occur in the proportion of about one in twenty in any of the species. I have seen specimens of *duquesnii* with nine rays on one side and ten on the other. I have therefore discarded all consideration of the number of ventral rays as a specific character. In regard to the number of scales in the lateral line, the usual number in most of the species is 43 to 44; but of every species in which I have been enabled to examine a large series of individuals, I have found a range extending from 42 to 49. I have seen ten-rayed specimens of *duquesnei* with large scales, and nine-rayed *erythruri* with small ones. Within the limit of 42 to 50 I therefore do not consider the number of scales as a permanent specific character. The greater prominence of the muzzle in *duquesnei*, as observed by Professor Cope, is perhaps accidental or individual. At all events, it is too uncertain a feature to base a species on.

The *Rutilus melanurus* of Rafinesque is, as I have elsewhere shown, probably a young Red Horse, with a dusky-shaded dorsal and caudal, which that acute, but superficial, observer mistook for a species of Dace.

Specimens in United States National Museum.

Number.	Locality.	Collector.
	Var. *macrolepidotum.*	
7995	.....	
8754	"Probably North Carolina".....	
9056	.....	
10631	Potomac River	J. W. Milner.
10682	Potomac River	J. W. Milner.
10689	Potomac River	J. W. Milner.
11106	Potomac River	J. W. Milner.
12316	Potomac River	J. W. Milner.
12317	Potomac River	J. W. Milner.
12318	Potomac River	J. W. Milner.
12319	Potomac River	J. W. Milner.
16755	Ash Creek, Arizona ("*congestus*")	Dr. J. T. Rockrock
18251	Potomac River	G. B. Goode.
18253	Potomac River	G. B. Goode.
18254	Potomac River	G. B. Goode.
18255	Potomac River	G. B. Goode.
18256	Potomac River	G. B. Goode.
18257	Potomac River	G. B. Goode.
19451	Potomac River	J. W. Milner.
20230	Black River, New York.	S. F. Baird.
20263	Nebraska, Pacific Railroad Survey	Governor Stevens
20278	"Brooklyn".....	J. C. Brevoort.
	Var. *duquesnii.*	
8025	Yellow Creek, Ohio	S. F. Baird.
8526	.....	
10794	Cincinnati, Ohio	J. W. Milner
12268	Cincinnati, Ohio	J. W. Milner.
12269	Cincinnati, Ohio	J. W. Milner.
12272	Cincinnati, Ohio	J. W. Milner.
20040	Cumberland River, Tennessee	A. Winchell.
20075	.....	
20773	Normal, Illinois.....	S. A. Forbes.

6. MYXOSTOMA AUREOLUM (*Le Sueur*) *Jordan.*

Golden Red Horse. Lake Mullet.

1817—*Catostomus aureolus* LE SUEUR, Journ. Ac. Nat. Sci. Phila. i, 95.

Catostomus aureolus KIRTLAND, Rept. Zool. Ohio, 168, 1838.

Catostomus aureolus KIRTLAND, Boston Journ. Nat. Hist. iii, 349, 1840.

Catostomus aureolus DEKAY, New York Fauna, part iv, Fishes, 201, 1842.

Catostomus aureolus STORER, Synopsis, 420, 1846.

Catostomus aureolus AGASSIZ, Lake Superior, 357, 1850.

Ptychostomus aureolus AGASSIZ, Am. Journ. Sc. Arts, 2d series, xix, 204, 1855.

Ptychostomus aureolus PUTNAM, Bull. Mus. Comp. Zool. 10, 1863.

Ptychostomus aureolus COPE, Proc. Ac. Nat. Sc. Phila. 285, 1864.

Catostomus aureolus GÜNTHER, Cat. Fishes Brit. Mus. vii, 16, 1868. (In part; description apparently copied and confused.)

Ptychostomus aureolus COPE, Proc. Am. Philos. Soc. Phila. 476, 1870

Moxostoma aureolum JORDAN, Man. Vert. 295, 1876.

Teretulus aureolum NELSON, Bull. No. 1, Ills. Mus. Nat. Hist. 49, 1876.

Teretulus aureolus JORDAN & COPELAND, Check List, 157, 1876. (Name only.)

Moxostoma aureola JORDAN & GILBERT, in Klippart's Rept. 53, 1876. (Name only.)

Myxostoma aureola JORDAN, Man. Vert. E. U. S. ed. 2d, 314, 1878.

1823—*Catostomus lesueurii* RICHARDSON, Franklin's Journal, 772, 1823.

1836—*Cyprinus* (*Catostomus*) *sueurii* RICHARDSON, Faun. Bor.-Am. Fishes, pp. 118, 303, 1836.

Catostomus sueurii CUV. & VAL., Hist. Nat. des Poissons, xvii, 465, 1844.

Catostomus sueuri DEKAY, New York Fauna, part iv, Fishes, 203, 1842.

Catostomus sueurii STORER, Synopsis, 425, 1846.

Ptychostomus sueurii COPE, Proc. Am. Philos. Soc. Phila. 477, 1870.

Teretulus sueurii JORDAN & COPELAND, Check List, 157, 1876. (Name only.)

1868—*Catostomus macrolepidotus* GÜNTHER, Cat. Fishes Brit. Mus. vii, 18, 1868. (Excl. syn. part. Not of Le Sueur.)

HABITAT.—Great Lake Region, Upper Missouri and Ohio Valleys, and northward.

This species is very closely related to the last, and may possibly be a variety of it, as specimens of var. *macrolepidotum* often occur which are with difficulty distinguished from it. In general, however, the smaller head, smaller mouth, and deeper body of *aureolum* sufficiently distinguish them. This species is less abundant than *macrolepidotum*, and is apparently more northerly in its distribution. It has been well figured by DeKay.

The synonymy of this species needs no special remark. It seems probable that *C. lesueurii* belongs here, although the statement that "the muzzle projects an inch beyond the mouth" in a specimen 19 inches long, if correct, would indicate difference. The name "*le sueurii*" was first given, and afterwards changed to "*sueurii*" on the ground that the article "*le*" is not an integral part of Le Sueur's name.

Specimens in United States National Museum.

Number.	Locality.	Collector.
7756	.....	
8252	Carlisle, Pa	S. F. Baird.
11074	Sandusky, Ohio	J. W. Milner.
11151	Sandusky, Ohio	J. W. Milner.
12267	Cincinnati, Ohio	J. W. Milner.
12294	Cincinnati, Ohio	J. W. Milner.
12446	Ecorse, Mich	J. W. Milner.
20272	Root River, Wisconsin	S. F. Baird.

7. MYXOSTOMA CRASSILABRE (*Cope*) *Jordan*.

Thick-lipped Mullet.

1870—*Ptychostomus crassilabris* COPE, Proc. Am. Philos. Soc. Phila. 477, 1870.
Teretulus crassilabris JORDAN & COPELAND, Check List, 157, 1876. (Name only.)
Myxostoma crassilabris JORDAN, Man. Vert. ed. 2d, 314, 1878.

HABITAT.—Neuse River, North Carolina.

This species is known only from Professor Cope's description. It appears to be distinct from *M. aureolum*, which is probably its nearest relative. Nothing has been noted in regard to its habits.

8. MYXOSTOMA CONUS (*Cope*) *Jordan*.

Long-nosed Mullet.

1870—*Ptychostomus conus*, COPE, Proc. Am. Philos. Soc. Phila. 478.
Teretulus conus, JORDAN & COPELAND, Check List, 157, 1876. (Name only.)
Myxostoma conus, JORDAN, Man. Vert. ed. 2d, 314, 1878.

HABITAT.—Yadkin River, North Carolina.

This species is also known only from Professor Cope's account. There appears, however, to be no room for doubt as to its specific distinction. As stated by Professor Cope, "this fish represents the *P. coregonus* in the section with fully-developed lips."

It is taken in large numbers in the Yadkin River, "with *Pt. collapsus*, *Pt. robustus*, etc., but is of less value than they."

9. MYXOSTOMA ANISURA (*Rafinesque*) *Jordan*.

Long-tailed Red Horse.

1820—*Catostomus anisurus* RAFINESQUE, Ichthyologia Ohiensis, 54.
Myxostoma anisura JORDAN, Man. Vert. ed. 2d, 315, 1878.

1870—*Ptychostomus breviceps* COPE, Proc. Am. Philos. Soc. Phila. 478.

Teretulus breviceps JORDAN & COPELAND, Check List, 157, 1876. (Name only.)

Moxostoma breviceps JORDAN & GILBERT, in Klippart's Rept. 53, 1876. (Name only.)

Myxostoma breviceps JORDAN, Bull. U. S. Nat. Mus. 9, 50, 1877. (Name only.)

HABITAT.—Ohio Valley and Great Lakes.

This species, first described by Rafinesque in 1820, has been entirely lost sight of by succeeding writers, and I, doubting the existence in the Ohio River of a species characterized by the marked inequality of the caudal lobes, have hitherto followed Dr. Kirtland in using the name *anisura* for the fish recently named *collapsus* by Professor Cope. Some specimens lately examined by me from the Ohio River have shown the existence of a fish corresponding very closely to Rafinesque's account, and which really has the inequality of the caudal fin, on which he lays such emphasis, and which suggested the name *anisurus* (unequal-tail). This fish appears to be the same as that to which Professor Cope has given the name of *breviceps*. Professor Cope had, however, but a single specimen, in poor condition, and did not notice the falcation of the caudal, or, more likely, that fin was not preserved intact. I have, some time since, examined Professor Cope's type, preserved in the Museum of the Academy of Natural Sciences, at Philadelphia, and believe it to be identical with *M. anisura* Raf. The form of the head and body and of the mouth are similar in the two, and the dorsal in both is similarly falcate.

This species resembles *aureolum* in every respect, except that the dorsal fin is shorter, and elevated or falcate in front, the free border being deeply incised, and that the caudal fin is similarly elongated, the upper lobe being much the longer and greatly attenuated.

The following are the measurements of three specimens: 10,788, from Sandusky, and 12,267 and 12,294 from Cincinnati. The fractions indicate percentage of the length to the base of the caudal:—

Measurements of three specimens of Myxostoma anisura.

	10788.	12267.	12294.
Length, inches	2½	8¾	10½
Depth	.28	.27	.26
Length of head	.18	.17	.18
Width of interorbital area	.08	.....	.....
Length of snout	.07½	.....	.....
Eye	.05	.....	.....
Length of base of dorsal	.15½	.14½	.16
Height of longest ray of dorsal	.22	.22	.23½
Height of last ray of dorsal	.10	.....	.....
Length of upper caudal lobe	.31	.29	.31
Length of lower caudal lobe	.26	.25	.25
Length of middle caudal rays	.13	.....	.....
Dorsal rays	2, 13	2, 13	2, 13
Scales	6–46–5	6–47–5	.....

It is perhaps barely possible that this fish is the male of *aureolum* at a certain age, but it seems to me decidedly improbable. The resemblance between the two is, however, very strong, and, except for the fins, they could hardly be distinguished.

Specimens in United States National Museum.

Number.	Locality.	Collector.
8505	.....	
10788	Sandusky, Ohio	J. W. Milner.
11105	Cincinnati, Ohio	J. W. Milner.
11107	Cincinnati, Ohio	J. W. Milner.
11108	Cincinnati, Ohio	J. W. Milner.

10. MYXOSTOMA PŒCILURA *Jordan.*

Variegated-tailed Red Horse.

1877—*Myxostoma pœcilura* JORDAN, Bull. U. S. Nat. Mus. x, 66, 1877.
Myxostoma pœcilura JORDAN, Man. Vert. ed. 2d, 315, 1878.

HABITAT.—Tangipahoa River, Southeastern Louisiana.

This singular species is known only from two specimens in the United States National Museum, recently collected by Mr. Fred. Mather, of the United States Fish Commission. Whether the peculiar form and coloration of the caudal is general or is confined to the male sex is not certain. In any event, it will serve to sharply distinguish this species from all the others now known. In other respects, it most approaches *M. macrolepidotum lachrymale.*

Specimens in United States National Museum.

Number.	Locality.	Collector.
*16928	Tangipahoa River, Louisiana	Fred. Mather.

11. MYXOSTOMA ALBIDUM (*Girard*) *Jordan.*

Small-scaled Red Horse.

1856—*Ptychostomus albidus* GIRARD, Proc. Ac. Nat. Sci. Phila. 172.

Ptychostomus albidus GIRARD, U. S. Mex. Bound. Surv. Ichth. 36, pl. xix, f. 5–8, 1859.

Teretulus albidus JORDAN & COPELAND, Check List, 157, 1876. (Name only.)

Myxostoma albidum JORDAN, Man. Vert. E. U. S. 315, 1878.

HABITAT.—Rio San Juan, near Monterey, New Leon, in Mexico.

This species is known only from Girard's figure and description. No account of the lips is given, but the mouth is said to be a "great deal larger" than in *M. congestum.* The description is trivial, but the figure, if at all correct, represents a species quite unlike our other members of the genus; the chief character being the much smaller size of the scales, which in the description are merely stated to be "smaller than in *congestus*". The species may possibly belong to some section of the genus other than the one in which it is here placed. The original types, No. 170, U. S. Nat. Museum, from Rio San Juan, near Monterey, New Leon, are no longer to be found.

12. MYXOSTOMA CERVINUM (*Cope*) *Jordan.*

Jump-rocks. Jumping Mullet.

1868—*Teretulus cervinus* COPE, Journ. Ac. Nat. Sci. Phila. 236.

Ptychostomus cervinus COPE, Proc. Am. Philos. Soc. Phila. 478, 1870.

Moxostoma cervinum JORDAN, Man. Vert. 296, 1876.

Teretulus cervinus JORDAN & COPELAND, Check List, 157, 1876. (Name only.)

Myxostoma cervinum JORDAN, Ann. Lyc. Nat. Hist. N. Y. xi, 365, 1877.

Myxostoma cervinum JORDAN, Man. Vert. E. U. S. ed. 2d, 315, 1878.

1868—*Catostomus duquesnii* GÜNTHER, Cat. Fishes Brit. Mus. vii, 483. (Not of Le Sueur, nor of p. 18.)

HABITAT.—Rivers of the South Atlantic States, from the James to the Chattahoochee.

This is a strongly marked and very abundant species, the smallest of its genus, and one of the smallest of the *Catostomidæ.* It occurs in the

*Two specimens, types of the species.

greatest abundance in the swift streams of the South, frequenti especially the rapids or "shoals", and often throwing itself from t water in its endeavors to reach some higher rock-pool. It is too sm and the flesh spoils too quickly to be much valued for food, but gre numbers are caught for "fun" by negroes and boys. The largest spe mens which I have seen were taken in the Chattahoochee, and are abo ten inches in length; ordinary individuals are four to six inches long.

Specimens in United States National Museum.

Number.	Locality.	Collector.
7633	.....	
8835	.....	
*14994	Catawba River	E. D. Cope.
—	Ocmulgee River	D. S. Jordan.
—	Saluda River	D. S. Jordan.
—	Chattahoochee River	D. S. Jordan.

13. MYXOSTOMA ALBUM (*Cope*) *Jordan.*

White Mullet.

1870—*Ptychostomus albus* COPE, Proc. Am. Philos. Soc. Phila. 472.
Teretulus albus JORDAN & COPELAND, Check List, 158, 1876. (Name only.)
Myxostoma alba JORDAN, Man. Vert. ed. 2d, 316, 1878.

HABITAT.—Catawba and other rivers of Eastern North Carolina.

This species is well marked by the peculiar form of the under li which is quite small—a narrow, regular crescent following the bounda of the mandible, not full, as in the species previously noted, nor wi the sides folding so as to meet on the middle line, as in the remaini species (excepting *thalassinum*). Specimens from North Carolina in t National Museum correspond well to Professor Cope's description, exce that the back is rather more elevated than one would infer from Pr fessor Cope's remarks. The dorsal rays are 12 and 13 instead of 1 The following are the measurements of two of them, 18,535 and 14,9 both from Kinston, N. C.:—

* Types.

Measurements of two specimens of Myxostoma album.

	18535.	14943.
Length, inches	13	11½
Depth (percentage of length to base of caudal)	.32	.30
Length of head	.20	.20
Width of interorbital area	.10	.10
Length of snout	.08½	.....
Diameter of orbit	.04	.....
Length of base of dorsal	.19	.17
Height of dorsal	.22	.18½
Height of last ray of dorsal	.09	.....
Length of outer caudal rays	.24	.....
Length of middle caudal rays	.24	.....
Length of pectorals	.21	.....
Number of dorsal rays	2, 13	2, 12
Scales	6–45–5	.....

The form is elliptical, not much compressed, but rather elevated, somewhat as in *Erimyzon sucetta*. Head short and stout, bluntish, broad, and rounded above; mouth somewhat inferior; the plicæ of the lips few and rather broken; dorsal fin high, its free border somewhat concave; caudal strongly forked; color lustrous white, with greenish reflections.

This is one of the largest species, reaching the weight of four pounds or more. Professor Cope states that it is much valued as a food-fish by people living in the neighborhood of Catawba River, where it is known as the White Mullet.

Specimens in United States National Museum.

Number.	Locality.	Collector.
10632	North Carolina	G. B. Goode.
14943	Kinston, N. C	G. B. Goode.
14990	North Carolina	G. B. Goode.
18535	Kinston, N. C	J. W. Milner.
19450	North Carolina	G. B. Goode.

14. MYXOSTOMA THALASSINUM (*Cope*) *Jordan*.

Green Mullet.

1870—*Ptychostomus thalassinus* COPE, Proc. Am. Philos. Soc. Phila. 472, 1870.

Teretulus thalassinus JORDAN & COPELAND, Check List, 158, 1876. (Name only.)

Myxostoma thalassina JORDAN, Man. Vert. ed. 2d, 316, 1878.

HABITAT.—Yadkin River.

I have not seen this species. From Professor Cope's description, it would appear to be allied to *M. album*, but distinguishable by the longer head. It is a large species, abundant in the Yadkin River, where it is used for food.

15. MYXOSTOMA VELATUM (*Cope*) *Jordan.*

Small-mouthed Red Horse.

1845—*Catostomus anisurus* KIRTLAND, Boston Journ. Nat. Hist. v, 269 (with plate). (Not of Rafinesque.)

Catostomus anisurus STORER, Synopsis, 424, 1846.

Ptychostomus anisurus JORDAN, Bull. Buffalo Soc. Nat. Hist. 94, 1876. (Name only.)

Moxostoma anisurus JORDAN, Man. Vert. 295, 1876.

Teretulus anisurus NELSON, Bull. No. 1, Ills. Mus. Nat. Hist. 49, 1876.

Teretulus anisurus JORDAN & COPELAND, Check List, 158, 1876. (Name only.)

Moxostoma anisurum JORDAN, Proc. Ac. Nat. Sc. Phila. 72, 1877.

Moxostoma anisurum JORDAN, Proc. Ac. Nat. Sc. Phila. 80, 1877.

Moxostoma anisura JORDAN & GILBERT, in Klippart's Rept. 53, 1877. (Name only.)

Myxostoma anisura JORDAN, Bull. U. S. Nat. Mus. ix, 33, 1877.

1870—*Ptychostomus velatus* COPE, Proc. Am. Philos. Soc. Phila. 471.

Moxostoma velatum JORDAN, Man. Vert. 296, 1876.

Teretulus velatum NELSON, Bull. No. 1, Ills. Mus. Nat. Hist. 49, 1876.

Teretulus velatus JORDAN & COPELAND, Check List, 158, 1876. (Name only.)

Moxostoma velata JORDAN & GILBERT, in Klippart's Rept. 53, 1876. (Name only.)

Myxostoma velata JORDAN, Man. Vert. ed. 2d, 317, 1878.

1870—*Ptychostomus collapsus* COPE, Proc. Am. Philos. Soc. Phila. 471.

HABITAT.—Upper Mississippi Valley to Georgia and South Carolina. Neuse, Yadkin, Catawba, Clinch, Youghiogheny and Wabash Rivers (*Cope*). Chickamauga, Ohio Wabash, Illinois, Rock, and Wisconsin Rivers (*Jordan*). Lake Erie (*Jordan*).

This species is one of the most widely distributed species, although it does not seem to be as abundant in individuals as several others. There is considerable variation in form among different specimens, but all the species with long dorsal fin and small ∧-shaped mouth appear to belong to one species, for which the name *velatum* should be retained.

The finding of a species with unequal caudal lobes renders it evident that the identification of Rafinesque's *anisurus* with this species is incorrect. The name next in order is *velatus* Cope. The difference in the size of the eye between *collapsus* Cope and *velatus* Cope appears to be due to difference in age merely. Younger specimens have the eye proportionally larger.

I did not find any specimens of this species in the United States National Museum. The types of *velatus* and *collapsus*, preserved in the Museum of the Academy of Natural Sciences, at Philadelphia, I have examined.

16. MYXOSTOMA CONGESTUM (*Baird & Girard*) *Jordan.*

Gibbous Sucker.

1854—*Catostomus congestus* BAIRD & GIRARD, Proc. Ac. Nat. Sc. Phila. 27.
Ptychostomus congestus GIRARD, Proc. Ac. Nat. Sc. Phila. 172, 1856.
Ptychostomus congestus GIRARD, U. S. Mex. Bound. Surv. Ichth. 36, pl. xxi, f. 5–8, 1859.
Catostomus congestus GÜNTHER, Cat. Fishes Brit. Mus. vii, 19, 1868.
Teretulus congestus JORDAN & COPELAND, Check List, 157, 1876. (Name only.)
Myxostoma congesta JORDAN, Man. Vert. ed. 2d, 317, 1878.
1872—*Ptychostomus bucco* COPE, Hayden's Geol. Surv. Wyoming, 1870, 437.
Teretulus bucco JORDAN & COPELAND, Check List, 157, 1876. (Name only.)

HABITAT.—Kansas to Texas.

The original type of *congestus*, No. 171, from Rio Salado, Texas, collected in 1851 by John H. Clark, seems to have disappeared from the Museum. No description of the mouth has been given, except that it is "very small". The species, therefore, probably has a mouth similar to that of *velatum*, and, if so, is probably identical with the species since described as *P. bucco* by Professor Cope. I have not seen the type of *P. bucco*, and, therefore, can only suggest the probable identity of the two; but, as the matter is likely to remain long unsettled, it seems best provisionally to unite them. "*P. congestus*" Cope & Yarrow is certainly not this species; more likely a form of *M. macrolepidotum*.

17. MYXOSTOMA PIDIENSE (*Cope*) *Jordan.*

Mullet of the Great Pedee.

1870—*Ptychostomus pidiensis* COPE, Proc. Am. Philos. Soc. Phila. 471.
Teretulus pidiensis JORDAN & COPELAND, Check List, 158, 1876. (Name only.)
Myxostoma pidiensis JORDAN, Man. Vert. ed. 2d, 317, 1878.

HABITAT.—Great Pedee River, North Carolina.

This appears to be a slender species, resembling "*P. cervinus* in color, form, and size". Professor Cope obtained it in the Yadkin River. I have not seen it. No specimens are in the National Museum.

18. MYXOSTOMA COREGONUS (*Cope*) *Jordan.*

Blue Mullet.

1870—*Ptychostomus coregonus* COPE, Proc. Am. Philos. Soc. Phila. 472.
Teretulus coregonus JORDAN & COPELAND, Check List, 158, 1876. (Name only.)
Myxostoma coregonus JORDAN, Man. Vert. ed. 2d, 317, 1878.

HABITAT.—Catawba and Yadkin Rivers, North Carolina.

I have not seen this species. Professor Cope states that "it never exceeds a foot in length, and is very abundant in the Catawba and Yadkin Rivers. It is caught with the preceding two species and is used for food, but is the least valued of all the species. It is called at Morganton, Blue Mullet." There are no specimens in the National Museum.

19. MYXOSTOMA PAPILLOSUM (*Cope*) *Jordan.*

Papillose Mullet.

1870—*Ptychostomus pappillosus* COPE, Proc. Am. Philos. Soc. Phila. 470.
Teretulus pappillosus JORDAN & COPELAND, Check List, 158, 1876. (Name only.)
Myxostoma papillosum JORDAN, Ann. Lyc. Nat. Hist. N. Y. xi, 366, 1877. (Ocmulgee River.)
Myxostoma papillosa JORDAN, Man. Vert. ed. 2d, 318, 1878.

HABITAT.—North Carolina to Georgia.

This species appears to be very abundant in all the streams from the Great Pedee to the Altamaha. In its general character and appearance, it is very similar to the rest of the genus; but the mouth is remarkably different, the lower lip being full, thick, decidedly papillose, strongly incised behind, being very much as in *Catostomus nigricans.*

My specimens do not agree very well with Professor Cope's description; but this is probably due to their greater size. Still, a possibility exists that two species of this type inhabit our South Atlantic States.

The head in my specimens is very large, flattish above, narrowed forwards, and more than one fourth of the length, without caudal. The mouth is very large and inferior. The body is oblong, compressed, heavy forwards; the back moderately elevated. The eye is quite large, high up, and well back. The free border of the dorsal fin is sometimes

convex, sometimes concave. The following are the measurements of two specimens:—

	14989.	18536.
Length, inches	16¼	12
Depth (percentage of length)	.29	.27
Head	.26	.24
Width of interorbital area	.10	
Length of snout	.12	
Diameter of orbit	.05	
Length of base of dorsal	.19	
Height of longest ray	.16	.19
Height of last ray	.10	
Dorsal rays	2,14	2,10
Scales	6-46-5	

In color, this species is smoky above, the sides silvery, the lower fins white.

Professor Cope says that "they attain one foot in length, and do not exceed one pound in weight". I have specimens a foot and a half long and of three pounds or more weight.

In the Ocmulgee, the species is next to *M. cervinum* the most abundant, and is called the White Mullet, or Sucker. Professor Cope found it quite abundant in the Catawba and the Yadkin Rivers, where it "is highly valued by the inhabitants as an article of food. It is regarded as the best of the Catostomi for that purpose. It is less frequently caught on the hook than some other species, but in the autumn, they come upon the weirs in considerable numbers. The fishermen call it the 'Shiner'."

Specimens in the United States National Museum.

Number.	Locality.	Collector.
14989	Kinston, N. C	J. W. Milner.
18536	Kinston, N. C	J. W. Milner.
18537	Kinston, N. C	J. W. Milner.
18538	Kinston, N. C	J. W. Milner.
18970	Kinston, N. C	J. W. Milner.
20906	Kinston, N. C	J. W. Milner.
—	Ocmulgee River, Ga	D. S. Jordan.

Genus MINYTREMA *Jordan.*

Minytrema JORDAN, Man. Vert. ed. 2d, 313, 1878.

Catostomus, Ptychostomus, Moxostoma, and *Erimyzon* sp., AUTHORS.

Type, *Catostomus melanops* Rafinesque.

Etymology, μινυς, reduced; τρῆμα, aperture, in allusion to the imperfections of the lateral line.

Species with the form, squamation, and general appearance of *Myxostoma*, but with the air-bladder in two parts, as in *Erimyzon*, and the lateral line imperfect—in the very young entirely obsolete, in half-grown specimens showing as a succession of deepened furrows, in the adult with perfect tubes, but interrupted, these tubes being wanting on some of the scales, especially posteriorly.

Head moderate, rather broad above; mouth moderate, inferior, horizontal, the upper lip well developed, freely protractile, the lower rather small, infolded, A-shaped in outline, plicate, with 12 to 20 plicæ on each side; lower jaw without cartilaginous sheath; eye moderate, rather high up, placed about midway of the head. Suborbital bones considerably developed, not very much narrower than the fleshy portion of the cheek below them, the posterior suborbital concavo-convex, about twice as long as deep, sometimes divided, the anterior somewhat deeper than long, often divided into two, sometimes united with the preorbital, which is well developed and much longer than broad. The number and form of these bones, except as to their depth, are not constant in the same species, and do not afford specific characters. Opercular bones well developed, not much rugose. Fontanelle evident, rather large. Gill-rakers rather long, in length about half the diameter of the eye. Isthmus moderate. Pharyngeal bones essentially as in *Myxostoma.*

Body rather elongate, subterete, becoming deep and rather compressed with age. Scales rather large, nearly equal over the body, the radiating furrows not specially marked. Lateral line as above described, interrupted in the adult, but with perfect tubes, imperfect in partly grown specimens, entirely obsolete in the young. Scales in a longitudinal series 44 to 47 in number, 12 to 14 in a transverse series from dorsal to ventrals.

Dorsal fin rather short and high, with about 12 developed rays, beginning rather nearer the snout than the base of the caudal. Pectoral fins moderate, not reaching ventrals, the latter not to vent. Ventrals rather in advance of the middle of the dorsal, their rays normally 9,

rarely 8 or 10. Anal fin high and short, often more or less emarginate in males. Caudal fin moderately forked, the lobes about equal.

Air-bladder with two chambers.

Males in spring with the head covered with many small tubercles.

But one species of this genus seems to be known. It is widely distributed in the waters of the Western and Southern States.

This genus has been recently separated from *Erimyzon*, on account of the peculiarities of the lateral line. The form of the body, the form of the mouth, and the character of the squamation differ considerably in the two genera.

Generic Characterizations.

MINYTREMA Jordan, 1878.—"Young specimens of this species (*melanops*) have no trace of a lateral line, as in *Erimyzon*. Older ones (6 to 8 inches) show a deepening of the furrows along the median series of scales. Adults of 12 to 18 inches show a series of completely developed tubes, which, however, are wanting on some of the scales, especially behind. As *Erimyzon* never shows any traces of the tubes of the lateral line, these peculiarities may be held to indicate generic distinction, and the name *Minytrema* is here proposed for *E. melanops*."—(JORDAN, *Man. Vert.* ed. 2d, 318, 1878.)

ANALYSIS OF SPECIES OF MINYTREMA.

Body oblong, little compressed; the young nearly terete; the adults deeper-bodied; the dorsal region not elevated: depth about 4 in length, varying from about 3 in adults to 4¼ in the young: head not very large, 4¼ in length of body (4¼ to 4½), not specially depressed: mucous pores rather strong: eye small, 5 to 6 in head: mouth quite inferior, horizontal, rather small: scales large, firm, regularly and smoothly imbricated, in 46 (44–47) longitudinal series and 13 (12 to 14) transverse series, the scales not crowded forwards: fin-rays usually, dorsal 12, anal 7, ventrals 9.

Coloration dusky above, with usually a black blotch behind the dorsal fin: each scale along the sides with a small, more or less distinct blackish spot at its base, these spots forming interrupted longitudinal lines along the rows of scales. These lines are usually very distinct, especially in the adult, but young specimens often show them faintly: sides and belly silvery, with a coppery lustre: sexual peculiarities moderately marked; very old males with the head covered with small tubercles in spring: no great changes with age, either in form or coloration: size large; maximum length about 18 inches ..... MELANOPS, 20.

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*As in all cases in the present paper, the *number of developed rays* is here understood, the one, two, or three rudimentary rays not being counted, and the last or double ray of the dorsal and anal being counted as one.

20. MINYTREMA MELANOPS (*Rafinesque*) *Jordan.*

Striped Sucker. Sand Sucker.

1820—*Catostomus melanops* RAFINESQUE, Ich. Oh. 57.

Catostomus melanopsis KIRTLAND, Zool. Ohio, 168, 1838.

Catostomus melanops KIRTLAND, Boston Journ. Nat. Hist. v, 271, 1845.

Catostomus melanops STORER, Synopsis, 424, 1846.

Ptychostomus melanops AGASSIZ, Am. Journ. Sc. Arts, 2d series, xix, 204, 1855.

Ptychostomus melanops COPE, Proc. Am. Philos. Soc. Phila. 478, 1870.

Erimyzon melanops JORDAN, Bull. Buffalo Soc. Nat. Hist. 95, 1876.

Erimyzon melanops JORDAN, Man. Vert. 294, 1876.

Erimyzon melanops NELSON, Bull. No. 1, Ills. Mus. Nat. Hist. 48, 1876.

Erimyzon melanops JORDAN & COPELAND, Check List, 157, 1876.

Erimyzon melanops JORDAN, Ann. Lyc. Nat. Hist. N. Y. xi, 347, 1877.

Minytrema melanops JORDAN, Man. Vert. ed. 2d, 318, 1878.

1844—*Catostomus fasciatus* (LE SUEUR MSS.) CUVIER & VALENCIENNES, Hist. Nat. des Poissons, xvii, 449.

Catostomus fasciatus STORER, Synopsis, 426, 1846.

Catostomus fasciatus GÜNTHER, Cat. Fishes Brit. Mus. vii, 19, 1868.

1856—*Moxostoma victoriæ* GIRARD, Proc. Ac. Nat. Sc. Phila. 171.

Moxostoma victoriæ GIRARD, U. S. Mex. Bound. Surv. Ichth. 35, pl. xx, f. 1–3, 1859.

1856—*Ptychostomus haydeni* GIRARD, Proc. Ac. Nat. Sc. Phila. 172.

Ptychostomus haydeni GIRARD, U. S. Pac. R. R. Expl. x, 220, pl. xlix, f. 1–4, 1858.

Teretulus haydeni JORDAN & COPELAND, Check List, 157, 1876.

1877—*Teretulus succtta* JORDAN & GILBERT, in Klippart's Rept. Fish Commr. Ohio, 53. (Supposed to be *C. sucetta* Lacépède, as it was perhaps in part the *C. suceti* of Cuv. & Val. and of Bosc.)

Erimyzon succtta JORDAN, Bull. U. S. Nat. Mus. x, 35, 1877.

HABITAT.—Great Lake Region to South Carolina and Texas.

This fish, although a very abundant one in the Mississippi Basin, seems to have been overlooked by most recent writers. Rafinesque described it rather poorly. Dr. Kirtland was able to recognize the fish from Rafinesque's account, and has given a very good description and an indifferent figure. Valenciennes described it fairly, and Agassiz seems to have been acquainted with it, although, deceived by its external appearance, he took it for a *Myxostoma* (*Ptychostomus*). Girard next described and figured it as two species, belonging to two different genera. Professor Cope, for some reason, did not obtain it in any of his collections, and seems to have had much difficulty in identifying Kirtland's account. In 1875, the writer, noticing certain resemblances to *Erimyzon oblongus*, was led to dissect a number of individuals, and found that the

air-bladder in all cases was bicellular, as in the genus *Erimyzon*. At that time he had never seen any specimens with a developed lateral line and then unquestioningly referred the species to *Erimyzon*. Later, Mr. Nelson noticed the occasional partial development of the lateral line, and recently, by the examination of a full series of specimens, the writer has been enabled to trace the stages in its growth.

This fish inhabits all the Western streams and lakes, usually in company with *Erimyzon sucetta*. It is fond of clear sluggish waters, and abounds in ponds and bayous. It is used for food, and is pretty good for a "Sucker", which is not saying much. This species is more than usually tenacious of life, and young specimens are rather interesting as aquarium fishes.

The synonymy of this species needs a few words. It was originally described by Rafinesque as a species with a lateral line. This first description is quite indifferent, but the account of the coloration, and the name, Striped Sucker, enabled Dr. Kirtland readily to identify it, but the latter writer found the "lateral line obsolete". Later, Valenciennes described it under Le Sueur's MSS. name of *fasciatus*, and found a lateral line. As Le Sueur's specimens were from the Wabash, there can be no doubt of their identity with *melanops*. Later, Dr. Girard described and figured Texan specimens without the lateral line under the name of *Moxostoma victoriæ*, and specimens with the lateral line from the Upper Missouri Region as *Ptychostomus haydeni*. The types of neither of these species are preserved, but no distinctions from *melanops* are noticed in either case by the describer, and the range of *melanops* certainly includes the Missouri river and the waters of Texas.

The name *sucetta* has been once or twice employed by me for this species, erroneously, as I am now convinced. I found this species in abundance in South Carolina; and Le Sueur, apparently quoting from Lacépède, says:—"Sides silvery, with brown spots at the base of the scales." Nevertheless, on inspection of Lacépède's description, and especially of the colored figure which he gives from a drawing by Bosc, it becomes evident that the *Cyprinus sucetta* Lacépède is the same as *Cyprinus oblongus* of Mitchill, a species equally abundant in the same waters. Bosc's drawing, although not giving the details of structure minutely, represents the general form and coloration of the body and fins, and this figure can only represent the *Cyprinus oblongus*. As the *Cyprinus sucetta* Lacépède is based entirely on information derived from Bosc, the name must be retained for the species which Bosc had fig-

ured. As for the expression, "brown spots at the base of the scales," if really originating with Bosc, as appears to be the case, it may have arisen from the confusion of *sucetta* with *melanops*, which species inhabits the same waters, or it may simply refer to the obscure duskiness of the bases of the scales, common to both species.

I have examined many specimens of *Minytrema melanops* from the Great Lakes, from various places in the Mississippi Valley, and from the Tennessee, Alabama, Santee, and other Southern rivers, and can find no differences of any importance. Indeed, the species seems to be very little variable for one so widely distributed.

Specimens in the United States National Museum.

Number.	Locality.	Collector.
7694	.....	
7768	.....	
8434	.....	
11050	Sandusky, Ohio.....	J. W. Milner.
11144	Sandusky, Ohio.....	J. W. Milner.
11145	Sandusky, Ohio.....	J. W. Milner.
12449	Sandusky, Ohio	J. W. Milner.
17800	Round Lake, Montgomery, Ala.....	Kumlien & Bean.
17808	Hempstead, Tex.....	Kumlien & Earll.
20275	.....	Dr. Kenners.
—	White River, Indiana.....	D. S. Jordan.
—	Etowah River, Georgia.....	D. S. Jordan.
—	Saluda River, South Carolina.....	D. S. Jordan.

Genus ERIMYZON *Jordan.*

Moxostoma AGASSIZ, Am. Journ. Sc. Arts, 1854, 200. (Not of Rafinesque.)

Erimyzon JORDAN, Bull. Buff. Soc. Nat. Hist. 1876, 95.

Teretulus COPE, Synopsis of Fishes of N. C. 2d ed. Addenda, 1877. (Not of Rafinesque.)

Cyprinus, Catostomus, and *Labeo* sp., EARLY AUTHORS.

Type, *Cyprinus oblongus* Mitchill = *Cyprinus sucetta* Lac.

Etymology, ἐρι, an intensive particle; μύζω, to suck.

Head moderate, rather broad above: mouth moderate, somewhat inferior, the upper lip well developed, freely protractile, the lower moderate, infolded, Λ-shaped in outline, plicate, with 12–20 plicæ on each side: lower jaw without cartilaginous sheath, rather stronger than usual,

and oblique in position when the mouth is closed, the mouth thus similar to that of *Ichthyobus*. Eye moderate, rather high up, placed about midway of the head: suborbital bones considerably developed, not very much narrower than the fleshy portion of the cheek below them, the posterior suborbital concavo-convex, about twice as long as deep, sometimes divided, the anterior somewhat deeper than long, sometimes divided into two, sometimes united with the preorbital bone, which is well developed and much longer than broad. Opercular bones moderately developed, scarcely or not rugose. Fontanelle evident, rather large. Gill-rakers rather long, about half the diameter of the eye in length. Isthmus moderately developed, about the width of the eye.

Pharyngeal bones weak, the teeth quite small, slender, and weak, rapidly diminishing in length upwards, each tooth narrowly compressed, with a cusp on the inner margin of the cutting surface, and some inequalities besides.

Body oblong, rather shortened, heavy forwards and considerably compressed.

Scales rather large, more or less crowded forwards, sometimes showing irregularities of arrangement, the longitudinal radiating furrows much stronger than usual, the scales rather longer than deep, but so imbricated in the adult that the exposed surfaces appear deeper than long.

Lateral line entirely wanting. Scales in the longitudinal series from head to base of caudal 35 to 45 in number; scales in transverse row from base of ventral to dorsal 12 to 18.

Dorsal fin rather short and high, with from 10 to 14 developed rays, the number usually 11 or 12.

Beginning of dorsal fin rather nearer snout than base of caudal. Pectoral fins moderate, not reaching ventrals; the latter not to vent.

Ventrals under a point rather in advance of the middle of dorsal; their rays normally 9, but occasionally 8 or 10.

Anal fin high and short, more or less emarginate or bilobed in adult males; caudal fin moderately forked or merely lunate, its two lobes about equal.

Air-bladder with two chambers.

This genus has a very wide range, one of its two known species probably occurring in all the streams of the United States east of the Rocky Mountains.

The existence of this genus seems to have been first noticed by DeKay, who, however, erroneously supposed it to be identical with the Afri-

can genus *Labeo* of Cuvier and Valenciennes. Its essential character—the absence of the lateral line—was first noticed by Professor Agassiz, who identified its typical species with *Catostomus* (*Moxostoma*) *anisurus* Rafinesque, and therefore erroneously called the genus *Moxostoma*. The application of the name *Moxostoma* to the Red Horse group was pointed out by the present writer in 1876; the name *Erimyzon* being then suggested for the group now under consideration.

The use of the name *Teretulus* for this genus has been lately suggested by Professor Cope, its species being among those enumerated by Rafinesque as composing his "*omnium gatherum*" to which the name *Teretulus* was applied. If we subtract from the original group *Teretulus*, the different component genera in order of time of proposal, the last one left would be *Erimyzon*, or rather *Minytrema*. But the name *Teretulus* has already been restricted by Professor Cope to the Red Horse group, the principal component of Rafinesque's *Teretulus*. In my opinion, it should remain there, although the earlier name *Myxostoma* renders it but a synonym. We cannot afford to reconsider our use of these old collective generic names whenever a new genus is proposed. The "rule of exclusion", if stiffly adhered to, would require the substitution of *Acomus* for *Pantosteus*, inasmuch as a species of the latter genus was referred by Girard to the former. This question is further discussed under *Myxostoma*.

Generic Characterizations.

LABEO DeKay, 1842.—"Dorsal long. No spines nor barbels. Lips fleshy, and frequently crenated."—(DEKAY, *New York Fauna, Fishes*, 192.)

MOXOSTOMA Agassiz, 1855.—"The species of this genus contrast greatly with those of all other genera of the family of Cyprinoids, by the total absence of external openings in the lateral line, visible upon the scales. There is indeed no *row of perforated scales upon the sides of the body*, to mark the main course of the system of tubes pervading the skin in most fishes, and the pores traversing the skin which covers the skull and cheeks, as well as the lower jaw, are so minute as to escape the unarmed eye. In this respect the genus *Moxostoma* differs greatly from all other abdominal fishes in which the lateral line is distinctly marked by a series of tubes traversing a prominent row of scales along the sides, and extending through the mastoids to the forehead, and along the preopercle to the symphysis of the lower jaw. This total absence of a lateral line is compensated by the presence of a few deeper radiating furrows in the posterior field of all the scales.

"The longitudinal diameter of the scales exceeds greatly the transverse, but the scales are imbricated in such a manner that the portion visible externally appears higher than long. The centre of radiation is placed in the middle of the scales; there are no radiating furrows upon the lateral fields, those of the posterior field are fewer and deeper than those of the anterior field; the concentric ornamental ridges of the

posterior field are also much broader and farther apart than those of the lateral and anterior fields. The scales are smaller upon the anterior portion of the body than upon the sides. Another remarkable peculiarity of this genus consists in the great difference there is among the adults in the form of their fins in the several sexes. The young also differ strikingly from the adults both in form and coloration. . . . . The body of Moxostoma is elongated and somewhat compressed, though stouter than that of *Ptychostomus* and *Catostomus* proper. The greatest depth is over the ventrals.

"The head is small; the small mouth opens obliquely forwards and downwards; when open the lower jaw is quite prominent. The lips are small and transversely ridged; the lower one is slightly bilobed. The dorsal is over the ventrals; its length considerably exceeds its height in the males; in the females its dimensions are more nearly equal. The pectorals and ventrals are more pointed and longer in the males than in the females. The lower margin of the anal fin is bilobed in the males, while in the females it is simply emarginated; in both sexes, the anal when bent backwards reaches the caudal.

"The pharyngeal bones have a greater resemblance to those of the genus *Ichthyobus* than to any other of the tribe of Catostomi; the symphysis however is shorter, and the teeth are neither so minute nor so numerous; they increase also more rapidly in size from above downwards, and are more strongly curved inwards, the innermost edge rising into an acute point, which is more prominent in the middle and upper teeth, than in the lower ones."—(AGASSIZ, *Am. Journ. Sci. Arts*, 1855, p. 200.)

MOXOSTOMA Girard, 1856.—"May be circumscribed by characters more natural than the preceding ones. And the most striking of these, it must be conceded, is the absence of that lateral line possessed by almost all fishes. The body is elongated and compressed; the head small; the mouth small also, opening obliquely forwards and downwards. The lips being small and transversally ridged; the inferior one being slightly bilobed. The anterior margin of the dorsal is situated in advance of the insertion of the ventrals. The dorsal fin is either higher than long or else its length is equal to its height, varying somewhat according to the sexes, as well as the anal, which is, however, always deeper than long. The shaft of the pharyngeal bones constitutes a very open curve, the convex margin of which is regular and entire. The teeth themselves are very much compressed, strongly curved inwardly, and much larger inferiorly than superiorly."—(GIRARD, *Proc. Ac. Nat. Sc. Phila.* 1856, p. 171.)

MOXOSTOMA Günther, 1868.—"Scales of moderate size; lateral line none; fins, mouth, gills and pharyngeal teeth, identical with those of *Catostomus* in all essential points."—GÜNTHER, *Cat. Fishes Brit. Mus.* vii, p. 20.)

ERIMYZON Jordan, 1876.—[Name suggested as a substitute for *Moxostoma* Ag., the type of *Moxostoma* Raf. (*Catostomus anisurus* Raf.) not being a member of this genus.]—(JORDAN, *Bull. Buff. Soc. Nat. Hist.* p. 95.)

ERIMYZON Jordan, 1876.—"Dorsal moderate; air-bladder in two parts; no lateral line; lips usually plicate."—(JORDAN, *Man. Vert.* ed. 1st, p. 292.)

ANALYSIS OF SPECIES OF ERIMYZON.

'Body oblong, compressed, becoming gibbous with age, the ante-dorsal region more or less elevated in the adults; the depth 3¼ in length, ranging from 2¾ in adults

to 4 in young: head stout, short, about 4¼ in length (4 to 4½), the interorbital space wide and depressed, the lower parts narrower, so that it is somewhat wedge-shaped downwards: eye not large, 4½ in head (4½ to 5½): mouth protractile downwards and forwards, the mandible oblique: scales usually closely imbricated and more or less crowded forwards, but often showing various irregularities in arrangement, about 43 (39–45) in a longitudinal series and 15 (14 to 16) in a transverse series between the ventrals and the dorsal. Fin-rays somewhat variable, the dorsal with 11 (10 to 13) developed rays, the anal with 7, and the ventrals with 9 (rarely 8).

Coloration varying with age; never distinct series of black spots along the rows of scales; young with a broad black lateral band bordered above by paler; in some specimens from clear water, this band is of a jet-black color and very distinct; in others, it is duller; later this band becomes broken into a series of blotches, which often assume the form of broad transverse bars; in adult specimens, these bars disappear, and the color is nearly uniform brown, dusky above, paler below, everywhere with a coppery or brassy, never silvery, lustre; the fins are dusky or smoky brown, rarely reddish-tinged: sexual differences strong; the males in spring with usually three large tubercles on each side of the snout, and with the anal fin more or less swollen and emarginate: adult specimens with the back gibbous and the body strongly compressed, in appearance quite unlike the young. Maximum length about 10 inches.....SUCETTA, 21.

** Body oblong, the back more elevated, the body deeper and more compressed than in the preceding, the greatest depth in advance of the dorsal fin being contained about 2¾ times in the length; nape less gibbous than in *sucetta;* head quite small and short, the large eye being almost exactly midway in its length, its length 4½ in that of the body; eye 4½ in head; interorbital space rather narrow, strongly transversely convex, less than half the length of the head: mouth small, protractile forwards, the lower jaw oblique; lips as in the preceding.

Scales large, much larger and much more uniform in their imbrication than in *E. sucetta;* 36 in a longitudinal series, and about 13 in a transverse series from the ventrals to the dorsal. Dorsal fin high, of 12 developed rays; anal moderate, with 7; ventrals large, with 10. Color dark olivaceous above, each scale along the sides reflecting pale from the strongly ridged middle part; these giving in certain lights the appearance of pale stripes along the rows of scales: fins dusky, especially at their tips.....GOODEI, 22.

21. ERIMYZON SUCETTA (*Lacépède*) *Jordan.*

Chub Sucker. Creek Fish. Mullet.

1803—*Cyprinus sucetta* LACÉPÈDE, Hist. Nat. des Poissons, v, 606, 610.

Catostomus sucetta LE SUEUR, Journ. Ac. Nat. Sc. Phila. 109, 1817.

Catostomus sucetta DEKAY, New York Fauna, part iv, Fishes, 203, 1842.

Catostomus suceti CUVIER & VALENCIENNES, Hist. Nat. des Poissons, xvii, 466, 1844.

Catostomus suceti STORER, Synopsis, 419, 1846.

Moxostoma sucetta AGASSIZ, Am. Journ. Sc. Arts, 2d series, xix, 202, 1855.

Moxostoma sucetta PUTNAM, Bull. Mus. Comp. Zool. 10, 1863.

Erimyzon sucetta JORDAN, Man. Vert. 295, 1876.

Erimyzon sucetta JORDAN & COPELAND, Check List, 157, 1876.

Erimyzon sucetta, JORDAN, Man. Vert. ed. 2d, 319, 1878.

1814—*Cyprinus oblongus* MITCHILL, Lit. & Phil. Trans. New York, 1, 459.

Catostomus oblongus LE SUEUR, Journ. Ac. Nat. Sc. 108, 1817.

Catostomus oblongus THOMPSON, Hist. Vt. 134, 1842. (Synonymy, but not description, which applies to *M. macrolepidotum*.)

Labeo oblongus DEKAY, New York Fauna, part iv, Fishes, 193, 1842.

Catostomus oblongus CUVIER & VALENCIENNES, Hist. Nat. des Poissons, xvii, 441, 1844.

Catostomus oblongus STORER, Synopsis, 423, 1846.

Moxostoma oblongum AGASSIZ, Am. Journ. Sc. Arts, 2d series, xix, 203, 1855.

Moxostoma oblongum PUTNAM, Bull. Mus. Comp. Zool. 10, 1863.

Moxostoma oblongum GILL, Canadian Nat. p. 19, Aug. 1865.

Moxostoma oblongum GÜNTHER, Cat. Fishes Brit. Mus. vii, 21, 1868.

Moxostoma oblongum COPE, Proc. Am. Philos. Soc. Phila. 468, 1870.

Moxostoma oblongum JORDAN, Fishes of Ind. 221, 1875. (Name only.)

Erimyzon oblongus JORDAN, Bull. Buffalo Soc. Nat. Hist. 95, 1875. (Name only; generic diagnosis of *Erimyzon*.)

Erimyzon oblongus JORDAN, Man. Vert. 294, 1876.

Moxostoma oblongum UHLER & LUGGER, Fishes of Maryland, 140, 1876.

Erimyzon oblongus NELSON, Bull. No. 1, Ills. Mus. Nat. Hist. 48, 1876.

Erimyzon oblongus JORDAN & COPELAND, Check List, 157, 1876. (Name only.)

Teretulus oblongus JORDAN & GILBERT, in Klippart's Rept. 53, 1876. (Name only.)

Teretulus oblongus JORDAN & GILBERT, in Klippart's First Report, Ohio Fish Commission, 85, pl. xii, f. 20, 1877.

Erimyzon oblongus JORDAN, Ann. Lyc. Nat. Hist. N. Y. xi, 346, 1877.

Erimyzon oblongus JORDAN, Ann. Lyc. Nat. Hist. N. Y. xi, 365, 1877.

Erimyzon oblongus JORDAN, Bull. U. S. Nat. Mus. ix, 36, 1877.

1817—*Catostomus gibbosus* LE SUEUR, Journ. Ac. Nat. Sc. Phila. i, 92.

Catostomus gibbosus STORER, Rept. Ichthy. Mass. 183, 1838.

Labeo gibbosus DEKAY, New York Fauna, part iv, Fishes, 194, 1842.

Catostomus gibbosus STORER, Synopsis, 420, 1846.

Catostomus gibbosus KIRTLAND, Hamilton Smith's Annals of Science.

Catostomus gibbosus STORER, Hist. Fishes Mass. 291, pl. xxii, f. 4, 1867.

1817—*Catostomus tuberculatus* LE SUEUR, Journ. Ac. Nat. Sc. Phila. i, 93.

Catostomus tuberculatus DEKAY, New York Fauna, part iv, Fishes, 199, 1842.

Catostomus tuberculatus CUVIER & VALENCIENNES, Hist. Nat. des Poissons, xvii, 444, 1844.

Catostomus tuberculatus THOREAU, Week on Concord and Merrimack, 38, 1868.

1817—*Catostomus vittatus* LE SUEUR, Journ. Ac. Nat. Sc. Phila. 104.

Catostomus vittatus DEKAY, New York Fauna, part iv, Fishes, 203, 1842.

Catostomus vittatus CUVIER & VALENCIENNES, Hist. Nat. des Poissons, xvii, 459, 1844.

Catostomus vittatus STORER, Synopsis, 422, 1846.

1820—*Catostomus fasciolaris* RAFINESQUE, Ich. Oh. 58.

1842—*Labeo elegans* DEKAY, New York Fauna, part iv, Fishes, 192.
Catostomus elegans STORER, Synopsis, 425, 1846.
1842—*Labeo esopus* DEKAY, New York Fauna, part iv, Fishes, 195.
Catostomus esopus STORER, Synopsis, 425, 1846.
1842—*Labeo elongatus* DEKAY, New York Fauna, part iv, Fishes, 394.
1855—*Moxostoma anisurus* AGASSIZ, Am. Journ. Sc. Arts, 2d series, xix, 202. (Not of Rafinesque.)
1855—*Moxostoma tenue* AGASSIZ, Am. Journ. Sc. Arts, 2d series, xix, 203.
Moxostoma tenue PUTNAM, Bull. Mus. Comp. Zool. 10, 1863.
Moxostoma tenue GÜNTHER, Cat. Fishes Brit. Mus. vii, 21, 1868.
Erimyzon tenuis JORDAN & COPELAND, Check List, 157, 1876.
1856—*Moxostoma claviformis* GIRARD, Proc. Ac. Nat. Sc. Phila. 171.
Moxostoma claviformis GIRARD, U. S. Pac. R. R. Expl. x, 219, pl. xlviii, f. 5–9, 1858.
Erimyzon claviformis JORDAN & COPELAND, Check List, 157, 1876.
1856—*Moxostoma kennerlyi* GIRARD, Proc. Ac. Nat. Sc. Phila. 171.
Moxostoma kennerlyi GIRARD, U. S. Mex. Bound. Surv. Ichth. 34, pl. xx, f. 7–9, 1859.
1856—*Moxostoma campbelli* GIRARD, Proc. Ac. Nat. Sc. Phila. 172.
Moxostoma campbelli GIRARD, U. S. Mex. Bound. Surv. Ichth. 35, pl. xx, f. 4–6, 1859.
Erimyzon campbelli JORDAN & COPELAND, Check List, 157, 1876.

HABITAT.—All waters of the United States east of the Rocky Mountains.

This protean species is, next to *Catostomus teres*, the most abundant and the most widely diffused of our species of Suckers. It occurs in every stream from Maine to Texas, and thrives in all sorts of waters, from the Great Lakes to the smallest ponds and brooks. Its variations in color and form are remarkable; but after the elimination of those which are known to be due to differences of sex, age, and surroundings, I find nothing left on which a difference of species or even a varietal difference may be based. I therefore unite all the nominal species of this genus, with a single exception, under the oldest specific name applied to any of them, *sucetta* of Lacépède.

The name *sucetta* has been passed from author to author for a long time, all the descriptions being based on the notes of Bosc and the account given by Lacépède, no one seeming to have any clear idea of what the original species was. The reasons for identifying *sucetta* with *oblongus* have been already given.

The name *sucetta* was spelled *suceti* by Valenciennes. I see no reason for this change. The derivation of the word is from the French *sucet*, a sucker; and *sucetta* is an agreeable latinization of the barbarous word. The identity of the nominal species *oblongus*, *gibbosus*, *tuberculatus*, *vittatus*, *esopus*, *elongatus*, and *elegans* was conclusively shown by Professor Agassiz. The *fasciolaris* of Rafinesque, as I have shown, is probably this species, which Rafinesque could hardly have overlooked.

Professor Agassiz's *anisurus*, considered by him as the Western representative of *oblongus*, must belong here. Professor Agassiz's *tenuis* from Mobile is not described; but as *sucetta* occurs abundantly in Alabama, it is safe to presume their identity. The type of *Moxostoma claviformis* Girard is now lost. Both figure and description point to the young of *sucetta*. The figure represents the scales rather smaller than usual, but it may not be correct. The types of *Moxostoma kennerlyi* Girard and of *Moxostoma campbelli* Girard, from Texas, have also disappeared; but they too seem to have been based on the young of the present species, and as *sucetta* certainly occurs in Texas, these nominal species must fall into the synonymy.

The Chub Sucker is one of the smallest species, rarely reaching a length of more than a foot. It is tenacious of life, and bites readily at a small hook, but is not much valued for food. The young are rather handsome, the black lateral band being sometimes very distinct. In the aquarium, they act as scavengers. The adult fishes, especially the males, are very dusky in color, and the males in spring are provided with three large tubercles arranged in a triangle on each side of the head. The fins of the adults are usually black, sometimes tinged with red.

Specimens in United States National Museum.

Number.	Locality.	Collector.
144	Sugar Loaf Creek, Arkansas	H. B. Möllhausen.
6860	Nova Scotia	
7638		
7646	Boston, Mass	
7771	Riverhead, L. I	S. F. Baird.
7776		
8280		S. F. Baird.
8376	North Carolina	McNair.
8459	Potomac River	
8497		
8700	Holliston, Mass	
8742	Detroit River	S. F. Baird.
8933	Brimfield	
8975		
9007	Delaware County	
9042		
9082		
9160		
9162	Jackson, Ill	R. Kennicott.

Specimens in United States National Museum—Continued.

Number.	Locality.	Collector.
9166	Abbeville, S. C	
9275		
9446	Aux Plaines River, Illinois	R. Kennicott.
9551	Lake Oconomowoc, Wisconsin	S. F. Baird.
9660		
10631	Potomac River	J. W. Milner.
10814	Sandusky, Ohio	Do.
11033	...do	Do.
11034	...do	Do.
11035	...do	Do.
11199	...do	Do.
11200	...do	Do.
12441	Halifax, Nova Scotia	Do.
14977	Potomac River	G. B. Goode.
16990	...do	J. W. Milner.
16991	...do	Do.
16992	...do	Do.
16993	...do	Do.
16994	...do	Do.
17816	Clear Creek, Texas	Kumlien & Earll.
17821	...do	Do.
17838	New Bedford, Mass	Thomas.
19158	Aux Plaines River, Illinois	R. Kennicott.
20061	Cedar Swamp, New Jersey	S. F. Baird.
20064	Schuylkill, River	J. H. Richard.
20105	Fox River, Wisconsin	S. F. Baird.
20157	Montgomery, Ala	Kumlien & Maxson
20231	Riverhead, L. I	S. F. Baird.
20254	Piermont, N. Y	Do.
20269	Sing Sing, N. Y	Do.
20360	Trenton, N. J	C. C. Abbott.
—	Cumberland River	A. Winchell.
—	White River, Indiana	D. S. Jordan.
—	Etowah River, Georgia	Do.
—	Saluda River, South Carolina	Do.

22. ERIMYZON GOODEI, *sp. nov.*

Goode's Sucker.

This species differs from *E. sucetta* in form, in the smaller size of tl head, in its greater convexity above, and in the larger size and great uniformity of the scales, which are not at all crowded or reduced fo wards.

The type is a fine specimen, 10¼ inches long, collected by Professor G. Brown Goode in the Saint John's River, Florida. It is numbered 19071 on the Museum Register. I have named the species for my friend, Professor Goode, one of the best of American ichthyologists, to whom we are indebted for the discovery of the species.

Specimens in United States National Museum.

Number.	Locality.	Collector.
19071	Saint John's River, Fla	G. Brown Goode.

Genus CHASMISTES *Jordan.*

Chasmistes JORDAN, Bull. Hayden Geol. Surv. Terr. 417, 1878.

Type, *Catostomus fecundus* Cope & Yarrow.

Etymology, χασμάω, to yawn or gape.

Fishes related to *Catostomus*, having the teeth, scales, and air-bladder as in that genus, but distinguished by the size and position of the mouth, the great development of the mandible, and by the small, smooth lips.

Head disproportionally large, forming more than one-fourth of the length, broad and flattish above; sides of head vertical, slightly directed inwards, the breadth through the cheeks less than the breadth above the eyes; eyes small, high up, rather posterior: mouth exceedingly large, terminal, the lower jaw in the closed mouth being very oblique, placed at an angle of about 45 degrees; the lower jaw very long and strong, its length more than one-third the length of the head, nearly half the length of the head in the adult, its tip when the mouth is closed about on a level with the eye; upper jaw very protractile; upper lip very thin (for a Sucker), and nearly smooth; snout elevated above the rest of the head, notably so when the mouth is closed; lower lip moderate, consisting of a broad flap on each side of the mandible, in front reduced to a narrow rim, the surface of the lip nearly smooth, without evident papillæ: nostrils large; suborbital bones narrow, but rather broader than in *Catostomus;* preorbital unusually large: mucous channels moderately developed; fontanelle very large; isthmus rather narrow: pharyngeal bones and teeth essentially as in *Catostomus.*

Body rather slender, tapering pretty regularly from the shoulders to the tail, but little compressed: caudal peduncle rather stout.

Fins moderate, the dorsal rays about 12, the anal 7: pectorals rather long, not quite reaching ventrals: ventrals reaching vent: anal fin high, reaching caudal: caudal fin rather long, its lobes equal.

Scales moderate, large on the caudal peduncle, much smaller and crowded anteriorly, 60 to 65 in the lateral line, about 18 in a transverse series from dorsal to ventrals.

Sexual peculiarities unknown.

Coloration usual.

Air-bladder in two parts.

Size moderate or rather large.

The single species now included in this genus is known only from Utah Lake. Its describers referred it to the genus *Catostomus*, but made no mention of its singular mouth and lips. The original type of the species is in very bad condition, the mouth being shrunken and distorted, and the bones of the head protruding through the skin, so that the peculiarities of the species are hardly recognizable.*

Generic Characterizations.

CHASMISTES Jordan, 1878.—"This genus is distinguished from *Catostomus* by the very large, terminal mouth, the lower jaw being very strong, oblique, its length about one-third that of the head. The lips are little developed, and are very nearly smooth. The type of the genus is *C. fecundus* Cope & Yarrow."—(JORDAN, *Bull. U. S. Geol. Surv. Terr.* vol. iv, No. 2, p. 417, 1878.)

ANALYSIS OF SPECIES OF CHASMISTES.

* Depth about 5 in length; head 3¼; interorbital space broad, 2¼ in head; eye 6 to 7 in head; width of the open mouth 3¼ in head. Dorsal 12. Anal 7. Scales 9-63-8. Color dusky above, pale below; the scales of the back and sides profusely covered with dark punctulations ..... FECUNDUS, 23.

23. CHASMISTES FECUNDUS (*Cope & Yarrow*) *Jordan.*

Sucker of Utah Lake.

1876—*Catostomus fecundus* COPE & YARROW, Wheeler's Expl. W. 100th Mer. v, Zool. 678, pl. xxxii, f. 1, 1 *a*.

Catostomus fecundus JORDAN & COPELAND, Check List, 156, 1876.

Chasmistes fecundus JORDAN, Bull. Hayden's Geol. Surv. Terr. vol. iv, No. 2, 417, 1878.

HABITAT.—Utah Lake, Utah, where it is excessively abundant. Not yet noticed elsewhere.

This singular species has been overlooked until quite lately. Dr. Yarrow states that it "is abundant in Utah Lake, and is called Sucker

* In fact, this specimen in its present condition looks to me more like *Catostomus occidentalis*, but the figure published by Cope & Yarrow represents *C. fecundus*. Both species occur in Utah Lake.

by the inhabitants. They run up the rivers to spawn in June; feed on the bottom and eat the spawn of better fish; spawning beds on gravel; bite at hook sometimes; are extremely numerous, and are considered a nuisance by the fishermen, but they meet with a ready sale in winter at an average price of 2½ cents per pound."

Specimens in United States National Museum.

Number.	Locality.	Collector.
12894	Utah Lake, Utah	Yarrow & Henshaw.
20337	Utah Lake, Utah	Dr. H. C. Yarrow. (Many specimens)
20932	Utah Lake, Utah	Dr. H. C. Yarrow. (Type *Chasmistes.*)
—	Utah Lake, Utah	Dr. H. C. Yarrow. (Types of the species.)

Genus CATOSTOMUS *Le Sueur.*

Catostomus LE SUEUR, Journ. Ac. Nat. Sc. Phila. i, 1817, 89. (Equivalent to family *Catostomidæ.*)

Hypentelium RAFINESQUE, Journ. Ac. Nat. Sc. Phila. i, 1818, 421. (As subgenus of *Exoglossum.*)

Decactylus RAFINESQUE, Ichthyologia Ohiensis, 1820, 60. (As subgenus of *Catostomus*, including the 10-rayed species.)

Hylomyzon AGASSIZ, Am. Journ. Sc. Arts, 1855, 205.

Minomus GIRARD, Proc. Ac. Nat. Sc. Phila. 1856, 173.

Acomus GIRARD, Proc. Ac. Nat. Sc. Phila. 1856, 173.

Catastomus GILL, Canadian Naturalist, 1865, August.

Decadactylus JORDAN, Man. Vert. 2d ed. 1878, 319. (As subgenus.)

Type, *Cyprinus catostomus* Forster, = *Catostomus hudsonius* Le Sueur, = *Catostomus longirostrum* Le Sueur.

Etymology, κατο, low; στόμα, mouth.

Etymology of Synonyms.

Hypentelium: probably ὑπὸ, below; πέντε, five; λοβος, lobe, as the name is said to refer to the 5-lobed lower lip, supposed to distinguish it from the 3-lobed subgenus *Maxillingua;* possibly, however, from ὑπὸ, below; εντελὴς, perfect.

Decactylus: δεκὰς, ten; δάκτυλος, toe, *i. e.*, 10 ventral rays, hence properly *Decadactylus.*

Hylomyzon: ὕλε, mud; μυζάω, to suck.

Acomus and ***Minomus*** are probably meaningless words, without etymology.

Head more or less elongate, its length ranging from 3½ to 5 times in that of the body, its form varying considerably in the different subgenera. Eye usually rather small, high up and median or more or less pos-

terior in position: suborbital bones narrow, longer than broad, much as in *Myxostoma:* fontanelle always present, usually widely open, in two species reduced to a narrow slit, but never wholly obliterated.

Mouth rather large, always inferior, and sometimes notably so; the upper lip thick, protractile, papillose; the lower lip greatly developed, with a broad free margin, deeply incised behind, so that it forms two lobes, which are often more or less separated: mandible horizontal, short, not one-third the length of the head and not reaching to opposite the eye: lower jaw usually without distinct cartilaginous sheath: opercular apparatus moderately developed, not rugose: pharyngeal bones moderately strong, the teeth shortish, vertically compressed, rapidly diminishing in size upwards, the upper surface of the teeth nearly even, or somewhat cuspidate.

Body oblong or elongate, more or less fusiform, subterete, more or less compressed.

Scales comparatively small, typically much smaller and crowded anteriorly, the number in the lateral line ranging from about 50 to 115, the number in a transverse series between dorsal and ventrals from 15 to 40: lateral line well developed, straightish, somewhat decurved anteriorly.

Fins variously developed: dorsal with its first ray nearly midway of the body, with from 9 to 14 developed rays; anal fin short and high, with probably always 7 developed rays; ventrals inserted under the middle or posterior part of the dorsal, typically with 10 rays, in one subgenus usually 9, the number often subject to variation of one; caudal fin usually deeply forked, the lobes nearly equal.

Sexual peculiarities not much marked, the fins higher in the male and the anal somewhat swollen and tuberculate in the spring: breeding males in some species with a rosy or orange lateral band.

Air-bladder with two chambers. Vertebræ in *C. teres* and *C. nigricans* 45 to 47.

"The *skeleton* in *Catostomus* has been well described by Valenciennes (XVII. p. 433). It is distinguished by the comparative want of solidity, certain bones consisting merely of a network of osseous matter. There is a large and broad fontanelle on the upper surface of the head, separating the parietal bones, and leading directly into the cerebral cavity. The occipital process is, below the anterior vertebræ, enlarged into a bladder-like swelling, which is not solid, but consists of a delicate network only. The prefrontal is advanced to the anterior part of the orbit.

The jaw-bones are very feeble, the intermaxillary being reduced to a thin lamella, which does not descend to the middle of the maxillary. The anterior part of the mandible is horizontal, thin and slightly dilated. The apophyses of the four anterior vertebræ are very strong and long."—(GÜNTHER, *Cat. Fishes Brit. Mus.* vii, 13.)

This genus as at present restricted comprises three well-marked groups, which may be accepted as subgenera, under the names *Catostomus*, *Decadactylus*, and *Hypentelium*. One of these groups, *Hypentelium*, has been usually considered as a distinct genus, on account of the differences in the form of the head and in the squamation. These differences are, however, individually of subordinate value, and should probably be held to designate a subgeneric section, rather than a distinct genus.

The group *Decadactylus* as here given is nearly equivalent to *Minomus* and *Catostomus* of Girard, while our *Catostomus* is Girard's *Acomus*. The type of *Catostomus*, as restricted by Agassiz, prior to Girard being *Cyprinus catostomus* Forster, one of the small-scaled group, the name belongs properly to that group, and *Acomus* is a simple synonym. *Decactylus* Rafinesque was not originally defined in any very tangible way, inasmuch as its author included in it species of *Myxostoma* and *Cycleptus*. As, however, it was intended for 10-rayed species, and as one among those originally placed in it was *C. teres* (as *C. bostoniensis*), the the name *Decactylus* (*Decadactylus*) may be used instead of *Minomus* as a designation for the subgenus to which *C. teres* belongs.

The genus *Catostomus* is, next to *Myxostoma*, the most rich in species. It is much the most widely distributed of the genera of Suckers, some of its members abounding in every river of North America, and one of them being found in Asia.

Generic Characterizations.

"CATOSTOMUS Le Sueur, 1817.

"*Back* with a single fin.

"*Gill-membrane* three-rayed.

"*Head* and *opercula* smooth.

"*Jaws* toothless and retractile.

"*Mouth* beneath the snout; lips plaited, lobed, or carunculated, suitable for sucking.

"*Throat* with pectinated teeth.

"The species which are here described are all possessed of the following general characters:—

"*Body.*—The body in general is elongated and varied in its form.

"*Scales.*—The scales in almost all the species are marked with radiated lines, and fimbriated on their edges; their form more or less rhomboidal or roundish.

"*Gill-covers.*—The gill-covers are large, and composed of three pieces; the anterior piece small in some, as is exemplified in the *C. macrolepidotus*, and in others large, as in the *C. communis*; opening or expansion wide.

"*Nostrils.*—The nostrils are double on each side, and separated by a membrane; the largest aperture near the eyes.

"*Eyes.*—The eyes in general are pretty large, a little oblong, without nictitating membrane: pupil black and roundish: irides yellowish, sometimes brown, as in the *C. gibbosus.*

"*Teeth.*—No *teeth* in the jaws, but those of the throat, on each side, are composed of a range of bones, generally blunt and thick at their summits, placed in a pectinated form, on an osseous, arcuated base, of which they are a component part, and sometimes terminate in a hooked point, as in the *C. maculosus;* these teeth are enveloped in a thick mass of whitish substance, which covers the throat, and supplies the place of a tongue.

"*Mouth.*—The *mouth* is generally lunated; to the palate is attached a membrane.

"*Viscera.*—The *intestinal canal* is very much developed, and it has its origin near the throat; the *stomach*, which is simple, and without plaits and curvatures, being a continuation of this canal, and appears to be confounded with it. The intestines make a number of circumvolutions; in a specimen of the *C. macrolepidotus* of 16 inches in length, they were 3 feet 5 inches in length. The *liver* is deliquescent, and soon passes into oil after exposure to the atmosphere. The *air-bladder* is subcylindrical, and divided, in most species, into two parts; in the *C. macrolepidotus*, it is separated into four parts. I have remarked in the intestines of these fishes river-shells of the genera *Lymnæa*, *Bulimus*, etc., which dwell on aquatic plants and on the rock at the bottom of the rivers; these shells the *Catostomi* are enabled to take with their lips, which are protruded forwards by means of their jaws.

"It is necessary to remark that in all the species which I have examined there is a line which runs from the nape, beneath the eyes, and another along the head, above the eyes, of small orifices, for the passage of mucus, which lines are well defined after the fish is dead and desiccated, but not so conspicuous when recent; these lines Forster improperly terms sutures. I will add that some species, in a dried state, have also a tuberculated appearance on the head, which tubercles are not discernible when the animals are living."—(LE SUEUR, *Journ. Ac. Nat. Sc.* i, p. 89.)

HYPENTELIUM Rafinesque, 1818.—"This species [*Exoglossum macropterum*] distinguished by so many secondary characters may be the type of a subgenus, which may be called *Hypentelium*, in reference to the five lobes of the lower jaw. The species with a three-lobed jaw may form then another section under the former name of *Maxillingua.*"—(RAFINESQUE, *Journ. Acad. Nat. Sc.* p. 420, 1818.)

CATOSTOMUS Rafinesque, 1820.—"Body oblong cylindrical, scaly. Vent posterior or nearer to the tail. Head and opercules scaleless and smooth. Mouth beneath the snout, with fleshy, thick or lobed sucking lips. Jaws toothless and retractible. Throat with pectinated teeth. Nostrils double. Gill-cover double or triple. Three branchial rays to the gill membrane. A single dorsal fin commonly opposite to the abdominal fins, which have from eight to ten rays."—(RAFINESQUE, *Ich. Oh.* p. 53.)

DECACTYLUS Rafinesque, 1820.—"Body nearly cylindrical, abdominal fins with ten

rays; tail equally forked. Besides the two following species (*C. duquesnii; C. elongatus*) the *C. bostoniensis* and *C. hudsonius* must be enumerated here."—(RAFINESQUE, *Ich. Oh.* p. 60.)

HYPENTELIUM Rafinesque, 1820.—"Body pyramidal slightly compressed, with very minute scales. Vent posterior. Head scaleless, nearly square, mouth terminal protruded beneath toothless, jaw shorter with five lobes, the middle one larger, lips very small. Abdominal fins anterior removed from the vent, dorsal fin anterior, opposed to them.

"This genus belongs to the family of the Cyprinidia, and is next to my genus *Exoglossum*, with which I had united it; but this last differs from it by an oblong body, flat head, lower lip trilobe not protruded, abdominal fins and dorsal fin medial, &c. The name expresses the character of the lower lip."—(RAFINESQUE, *Ich. Oh.* p. 68.)

CATOSTOMUS DeKay, 1842.—"Both lips thick, fleshy, and crenated or plaited; the lower lip pendant. Dorsal placed above the ventrals and usually short."—(DEKAY, *New York Fauna, Fishes*, p. 196.)

CATOSTOMUS Heckel, 1843.—"Os inferum; labia carnea, lata, rugosa, suctui apta; cirrhi nulli; præoperculum ante occiput. Pinna dorsalis brevis, rarius elongata; analis brevior, utraque radio osseo nullo. Dentes pharyngei pectiniformes.

$$\begin{array}{l|l} D : 3 & 8 - 13 - 29 \\ \hline A : 2 & 5 - 7 \end{array}$$

(Characters of Tribus IV, including *Catostomus*, *Rhytidostomus*, and ♀ *Exoglossum*.)

"Dentes pectiniformes 40 — 40. Os inferum; labia carnea; lata, rugosa ad suctum apta; cirrhi nulli. Pinna dorsalis et analis brevis, illa ante pinnas ventrales incipiens; radius osseus nullus. — Tractus intestinalis 2½—3 long. corp." — (HECKEL, *Fische Syriens*, p. 33.)

CATOSTOMUS Valenciennes, 1844.—"Ils diffèrent des ables [*Leuciscus*], avec lesquels ils ne sont pas sans affinité, par la position de leur bouche et par la forme des lèvres qui la bordent. Ces organes sont assez distincts de ceux des Chondrostomes.

"L'absence des barbillons les éloigne aussi des Labéons [*Labeo*], avec lesquels ils ont d'ailleurs moins de rapports que M. Cuvier ne le supposait quand il a rédigé le Règne Animal. Enfin ils diffèrent de tous ces genres par leurs dents pharyngiennes.

"Par la forme générale de leur corps, ils ressemblent à nos barbeaux [*Barbus*], dont ils ont presque tous la tête alongée, lisse et nue, et le museau un peu proéminent, mais ils n'ont pas leurs barbillons, et la dorsale manque de rayons épineux et dentelés. La bouche est située sous le museau; elle est sans dents, et les lèvres, élargies, lobées, caronculées, mais sans prolonguements filiformes, servent à constituer une sorte de ventouse au moyen de laquelle ces poissons peuvent adherer ou sucer. Les pharyngiens sont grands et arqués, presque en demi-cercle; tout le bord interne est garni de dents comprimées, à couronne striée, un peu plus large que la base; toutes ces dents décroissent regulièrement depuis les inferiéures jusqu'aux supérieures, le nombre en varie selon les espèces; elles forment un peigne sur le corps l'os. Les opercules sont grands; les narines ont chacune, comme à l'ordinaire, deux ouvertures rapprochées; les yeux assez larges, sont elliptiques, et ont l'iris ordinairement jaune; les écailles sont en général petites sur la nuque et près de la tête, et elles vont ensuite en augmentant à mésure qu'on s'en approche de la queue; elles sont plus ou moins rhomboïdales et striées ou frangées.

"Les viscères rappellent ceux des cyprinoïdes en général, mais l'intestin, à cause de ses nombreux replis, a encore plus d'étendue. . . . Le foie se résout bientôt en huile; la vessie aérienne est communément divisé en deux et communique avec le haut de l'œsophage comme dans nos cyprins."—(VALENCIENNES, *Hist. Nat. des Poissons*, xvii, pp. 423–424.)

HYLOMYZON Agassiz, 1855.—"The name of this genus is a mere translation of the vernacular name of its type, the Mud-Sucker of the West, framed in imitation of Petromyzon, but expressing its habits of living in the mud. The body is stout and heavy in front, and tapers off rapidly from the shoulders towards the tail; behind the dorsal it is nearly cylindrical in form.

"The short quadrangular head is broad and flat above, its sides are vertical. The eyes are of moderate size and elliptical in form; the superorbital ridges are elevated above the general level of the head. The mouth is inferior, and encircled by broad fleshy lips which are covered with small grains or papillæ. The lower lip is bilobed. The dorsal is over the ventrals, and nearer the head than the tail; its height and length are nearly equal. The pectorals and ventrals are broad and rounded, the anal fin is slender and reaches the caudal. The scales are largest on the anterior portion of the body. They are slightly longer than high, the ornamental concentric ridges of the posterior field are broader and farther apart than those of the lateral and anterior fields; those of the anterior and posterior fields rather remote, about equal in number. Tubes of the lateral line arising from the centre of radiation.

"The teeth are compressed, so that their sharp edge projects inwards; at the same time they are slightly arched inwards and inserted obliquely upon the pharyngeal bones. They increase gradually in size and thickness from above downwards. The masticating ridge of the teeth is transverse, compressed in the middle and sharp; its upper and lower edges are rounded and more projecting, the inner point, however, more projecting than the outer one."—(AGASSIZ, *Am. Journ. Sci. Arts*, 1855, p. 205.)

CATOSTOMUS Agassiz, 1855.—"I have retained the name of Catostomus for the type to which it was originally applied by Forster. The body is elongated, fusiform and slightly compressed. The snout is short and blunt, and projects but little beyond the mouth, which is inferior. The lower jaw is short and broad. The lips are fleshy and strongly bilobed below; their surface is conspicuously granulated or papillated. The head is considerably longer than high. The dorsal is large and mostly in advance of the ventrals; its length is greater than its height. The anal fin is long and slender, and reaches the caudal. The sexual differences, so conspicuous in the genus Moxostoma and Ptychostomus, are hardly to be noticed in this genus. The other fins are of moderate size, and more or less pointed.

"The scales are much smaller on the anterior than on the posterior portion of the body; nearly quadrangular, with rounded angles, but somewhat longer than high; the ornamental concentric ridges of the posterior field broader than those of the lateral and anterior fields; the radiating furrows more numerous than in Hylomyzon and Ptychostomus, and encroaches upon the lateral fields, where, in some species, they are nearly as numerous as upon the anterior and posterior fields. Tubes of the lateral line wider than in Hylomyzon and Ptychostomus, extending from the centre of radiation to the posterior margin.

"The pharyngeals are stout and compact, the outer margin not so spreading as

in Ptychostomus; the teeth are blunter and larger comparatively than in any other genus of the tribe, increasing more rapidly in size from above downwards, so that those of the middle of the arch are already of the same cast as those of the lower part of the comb; their crown is blunt and the inner edge rises into a blunt cusp."—(AGASSIZ, *Am. Journ. Sc. Arts*, 1855, p. 207.)

MINOMUS Girard, 1853.—"We propose to include under the head of *Minomus*, such species as are characterized by an elongated and fusiform body, a head longer than deep; a dorsal fin either higher than long, or with both dimensions equal. The lips being tuberculated, moderately bilobed. The pharyngeals not expanded laterally, but considerably bent inwardly. The teeth compressed, decidedly bicuspid, but the inner projection more developed than the outer. The scales being nearly of the same size, but slightly smaller anteriorly than posteriorly." (Includes *C. insignis*, *C. plebeius*, and *C. clarkii*.)—(GIRARD, *Proc. Ac. Nat. Sc. Phila.* 1856, p. 173.)

ACOMUS Girard, 1856.—"And then giving the name of *Acomus* to those species in which the head is very elongated, the dorsal higher than long, and the scales much smaller upon the anterior region of the body than upon the posterior. The lips being papillated and very deeply cleft. The pharyngeals are gently arched and not expanded; the teeth compressed and bituberculated, the inner projection conspicuous; the outer one obsolete, though existing." (Includes *C. forsterianus*, *C. aurora*, *C. latipinnis*, *C. guzmaniensis*, *C. generosus*, *C. griseus*, and *C. lactarius*.)—(GIRARD, *Proc. Ac. Nat. Sc. Phila.* 1856, p. 174.)

CATOSTOMUS Girard, 1856.—"The genus *Catostomus*, Le Sueur, would then be restricted to such species in which the head is moderately elongated, the dorsal fin generally longer than high, and the size of the scales less disproportionate anteriorly and posteriorly than in *Acomus*. The lips are papillated and deeply cleft. The pharyngeals provided with a little expansion inferiorly. The teeth are compressed, with the inner projection of the crown alone developed." (Includes *C. hudsonius*, *C. communis*, *C. occidentalis*, *C. labiatus*, *C. macrocheilus*, *C. sucklii*, and *C. bernardini*.)—(GIRARD, *Proc. Ac. Nat. Sc. Phila.* 1856, p. 174.)

CATASTOMUS Gill, 1865.—"Snout long. Lateral line present, nearly straight. Lips papillated."—(GILL, *Canadian Naturalist*, Aug. 1865, p. 19, reprint.)

CATOSTOMUS Günther, 1868.—"Scales of small, moderate or large size. Lateral line present, running along the middle of the tail. Dorsal fin of moderate extent, with not more than about seventeen rays, opposite to the ventrals, without spine. Anal fin very short, but deep. Fins of the males generally more produced than those of the females, and frequently with horny tubercles. Mouth inferior, with the lips more or less thickened and papillose, the lower frequently bilobed. Barbels none. Gill-rakers well developed, soft, the upper lanceolate, the lower quite membranaceous, low folds crossing the bone. Pseudobranchiæ. Pharyngeal bones sickle-shaped, armed with a comb-like series of numerous compressed teeth, the teeth becoming larger and broader towards the lower end of the series."—(GÜNTHER, *Cat. Fishes Brit. Mus.* vii, p. 12.)

CATOSTOMUS Jordan, 1876.—"Air bladder in two parts; lateral line well developed; lips papillose; scales much smaller anteriorly than posteriorly; interorbital space convex; body sub-terete."—(JORDAN, *Man. Vert.* 1876, p. 292.)

HYPENTELIUM Jordan, 1876.—"Air bladder in two parts; lateral line well developed; lips papillose; scales about as large on front part of body as on tail; body

tapering rapidly from shoulders to tail; interorbital space concave; length of head greater than depth of body."—(JORDAN, *Man. Vert.* 1876, p. 292.)

CATOSTOMUS Cope & Jordan, 1877.—"Body oblong or elongate, with a short, subquadrate dorsal fin; air bladder in two parts; lateral line well developed; fontanelle distinct."—(JORDAN, *Proc. Ac. Nat. Sc. Phila.* 1877, p. 81.)

HYPENTELIUM Jordan, 1878.—"Body oblong or elongate, with a short subquadrate dorsal; anal rays uniformly 7; mouth normal, the lower lip undivided or deeply lobed; lips tuberculate; lateral line well developed; fontanelle distinct; no mandibulary sheath; scales moderate, not crowded forwards, about equal over the body; body long, and little compressed; head transversely concave between orbits, long and flattened, the physiognomy being therefore peculiar; ventral rays 9."—(JORDAN, *Man. Vert.* ed. 2d, 1878, pp. 309–310.)

CATOSTOMUS Jordan, 1878.—[As in the preceding except] "Scales small, smaller anteriorly and much crowded; head transversely convex between orbits; ventral rays normally 10."—(JORDAN, *Man. Vert.* ed. 2d, 1878, pp. 309–310.)

DECADACTYLUS Jordan, 1878 (as subgenus).—"Lateral line with 60 to 65 scales; snout comparatively short."—(JORDAN, *Man. Vert.* ed. 2d, p. 319.)

CATOSTOMUS Jordan, 1878 (as subgenus).—"Lateral line with about 100 scales; snout much produced."—(JORDAN, *Man. Vert.* ed. 2d, p. 320.)

The three subgenera here recognized are characterized below. The single species of *Hypentelium* is found only eastward of the Rocky Mountains. *Catostomus* and *Decadactylus* each have representatives on both sides of the mountains. It is a curious fact that the Southwestern representatives of each, as a rule, have the upper lip more developed, and with more numerous series of papillæ, than the Eastern ones. In this respect as in others, these Western species approach the genus *Pantosteus*, a group exclusively Western in its distribution.

ANALYSIS OF SPECIES OF CATOSTOMUS.

* Scales moderate; not crowded anteriorly, nearly equal over the body; 48 to 55 in the lateral line; 12 to 15 in a transverse series from dorsal to ventrals: head flattened above, transversely concave between the orbits, the frontal bone thick, broad, and short, the physiognomy being therefore peculiar: ventral rays normally 9: upper lip very thick, strongly papillose, with a broad, free margin, which has upwards of 8 to 10 series of papillæ upon it. Lower lip greatly developed, strongly papillose, considerally incised behind, but less so than in *Catostomus* proper: fontanelle shorter and smaller than in *Decadactylus*: pectoral fins unusually large. (*Hypentelium.*)

x. Depth 4¼ to 5 in length; head 4 to 4¼; eye rather small, 4½ to 5 in head: color olivaceous; sides with brassy lustre; belly white; back brown, with several dark cross-blotches, irregularly arranged, these becoming obsolete in old individuals; lower fins dull red, with some dusky shading: size large; maximum length about two feet ..... NIGRICANS, 24.

y. Dorsal with 11 developed rays: scales 7–50–5: head rather longer, 4 to 4¼ in length: pectoral fins rather longer: colors relatively dull; no distinct whitish stripes along the rows of scales. *nigricans.*

yy. Dorsal with 10 developed rays: scales 6–48–5: head rather shorter, 4¼ in length: pectoral fins rather shorter: colors brighter; blackish above; belly abruptly white; a pale spot at the base of each scale, these forming conspicuous whitish streaks along the rows of scales..... *etowanus.*

** Scales small, reduced, and crowded anteriorly more or less; 58 to 72 in the lateral line and about 20 to 25 in a transverse series from the ventrals to the dorsal: snout moderate or rather short. (*Decadactylus.*)

† Upper lip comparatively thin, with but few (2 or 3) rows of papillæ.

a. Dorsal fin with but 10 or 11 developed rays; scales but little reduced in size forwards.

b. Body moderately stout; depth 4¼ in length; head very small and short, about 5 in length; eye moderate; fins all notably small: scales small, subequal, 9–70–9, larger on the middle of the body than on the caudal peduncle: body with scattered, dusky, nebulous spots ..... CLARKI, 25.

bb. Body rather elongate, subterete, heavy at the shoulders and tapering backwards, the depth about 5 in length; head moderate, about 4¼ in length; mouth comparatively small; lips moderate, the upper narrow, with about two rows of large tubercles: scales little crowded forwards, 58 to 63 in the lateral line, 19 in a cross-series: a series of dusky spots along each row of scales, as in *Minytrema melanops;* the spots sometimes obscure. INSIGNIS, 26.

aa. Dorsal with 11 to 13 developed rays: scales much reduced and crowded anteriorly.

c. Body moderately stout, varying with age, subterete, heavy at the shoulders, the depth 4 to 4¼ in length: head rather large and stout, conical, flattish above, its length 4 to 4¼ in body (3¼ to 4¼ in young); snout moderately prominent, scarcely overpassing the mouth; mouth rather large, the lips strongly papillose, the upper moderate, with two or three rows of papillæ: scales crowded anteriorly, much larger on the sides than below; scales 10–64 to 70–9: coloration olivaceous; males in spring with a faint rosy lateral band; young brownish, more or less mottled, often with about three large confluent lateral blotches, which sometimes form an obscure lateral band. TERES, 27.

†† Upper lip thick and full, with several (5 to 8) rows of papillæ: scales crowded forwards.

† Fontanelle well developed: lips without evident cartilaginous sheath.

d. Dorsal fin comparatively long, of 12 to 14 rays.

e. Mouth quite large, with very large lips, the upper full and pendent, with 6 to 8 rows of strong papillæ: head large, 4¼ in length, rather narrow, quadrangular, the snout projecting: eye large: dorsal fin much longer than high, its rays about 14: scales 12–72–10: coloration rather dark; a dusky lateral stripe..... MACROCHILUS, 28.

ee. Mouth comparatively small, smaller than in *C. teres;* the upper lip thick, with 5 or 6 rows of papillæ, which are moderately large: head rounded above, 4¼ in length, the profile steeper than in *C. teres*, the snout more pointed, the two sides of the head more convergent forwards: eye small: dorsal fin longer than high, its rays 12 to 14: scales 13–72–10.

OCCIDENTALIS, 29.

dd. Dorsal fin short, higher than long, of about 11 developed rays: head 4¼ in length, rather bluntish: mouth moderate, the labial papillæ largely developed, the upper lip full, with about 5 rows of large but rather sparse papillæ: scales 12–74–10: color dark above; sides clouded with black and yellow... LABIATUS, 30.

†† Fontanelle very small and narrow: both jaws with a weak cartilaginous sheath: body elongate, fusiform, subterete, the greatest depth 4¼ to 4½ in length: head small, conical, 4¼ in length: mouth quite large, with full, thick lips, the upper very wide and pendent, with about 6 rows of very strong papillæ: lower lip two-lobed, similarly papillose: interorbital space wide, convex: eye elevated, posterior, quite small: fins moderate; dorsal higher than long, with 10, rarely 11, rays: ventral rays 10: scales small, crowded forwards, 10 or 9–70–8: color dark; scales with dark punctulations..... ARÆOPUS, 31.

*** Scales very small, much reduced and crowded anteriorly; 83 to 115 in the lateral line, and 25 to 40 in a transverse series from the ventrals to the dorsal: body and head more or less elongate: sides with a broad rosy or orange lateral band in spring males. (*Catostomus.*)

§ Fontanelle well developed: jaws without evident cartilaginous sheath.

f. Upper lip comparatively thin and narrow, with but few (3 or 4) rows of papillæ.

g. Body shorter than in the next, but still elongated, its greatest depth 4¼ to 5 in length: head very large and long-acuminate, the muzzle nearly one-half its length, overhanging the rather large mouth: lips moderate; the upper pendent, with about 3 rows of small papillæ; the lower rather full, similarly papillose: eye nearly median, rather small, 8½ in head: scales small and crowded forwards, closely imbricated, 83 to 87 in

the course of the lateral line and about 28 in a cross-series from dorsal to ventrals: coloration very dark; fins dusky; scales everywhere finely punctate. Size large..TAHOENSIS, 32.

gg. Body elongate, subterete, the depth 4¼ to 4⅓ in length: head quite long and slender, 4¼ to 4⅓ in length, depressed and flattened above, broad at base, but tapering into a long snout, which considerably overhangs the large mouth: lips thick, coarsely tuberculate, the upper lip narrow, with 2 or 3 rows of tubercles: eye rather small, behind the middle of the head: scales very small, much crowded forwards, 95 to 114 in the course of the lateral line, and about 29 (26 to 31) in a cross row from dorsal to ventrals: dorsal rays 10 or 11: males in spring with the head and anal fin profusely tuberculate, the tubercles on the head small; the sides at that season with a broad rosy band: size large; the largest species in the genus.....LONGIROSTRIS, 34.

ff. Upper lip very broad, with several (5 or 6) rows of large papillæ.

i. Body long and slender, subterete, compressed behind, the form essentially that of *C. longirostris*, the depth contained 5½ times in the length: head large, 4 in length of body, the interorbital space broad and flat, 2½ in length of head: eye small, high up and rather posterior: preorbital bone very long and slender, its length about three times its depth: mouth large, precisely as in *C. latipinnis*, the upper lip pendent, very large, with 5 to 8 series of tubercles: dorsal fin not elongated or especially elevated, its rays 11, the beginning of the dorsal much nearer base of caudal than snout: caudal fin long and strongly forked: anal fin long and high, reaching base of caudal: ventrals not reaching vent: caudal peduncle stout and deep, its least depth more than one-third length of head, its length about two-thirds that of head: scales quite small, about as in *longirostris*, the exposed portion not notably lengthened: chest with well-developed scales; scales 16–100–14: coloration dusky brown, a dusky lateral band, pale below, the dark colors extending low; snout quite dark: size large..RETROPINNIS, 35.

ii. Body slender and elongate, the caudal peduncle especially long and very slender, the depth 5½ in the length: head moderate, 4⅓ in length, rather slender, with prominent snout and rather contracted, inferior mouth; outline of the mouth triangular, the apex forwards; the lips very thick, greatly developed, lower lip incised to the base, its posterior margin extending backwards to opposite the eye: jaws with a slight cartilaginous pellicle: eye small, high up: preorbital bone broad, scarcely twice as long as deep: scales long and low, posteriorly rounded, their horizontal diameter greater than the ver-

tical, 17-98 to 105-17: fins excessively developed, much more elevated in the males than in the females, the free border of the dorsal, in the males at least, deeply incised: in the males, the height of each of the three vertical fins is greater than the length of the head: dorsal rays 13, its beginning rather nearer snout than base of dorsal: caudal fin especially strong, the rudimentary rays at its base unusually developed: least depth of caudal peduncle less than one-third length of head: coloration rather silvery, the males probably rosy and tuberculate in spring..... LATIPINNIS, 36.

§§ Fontanelle almost obliterated, reduced to a narrow slit: each jaw with a well-developed cartilaginous sheath (as in *Pantosteus*).

j. Body subterete, compressed behind, the depth 5 in length: interorbital space 2 in head: head quite short, broad and rounded above, 4⅔ in length: eye small, far back and high up, 6 in head: mouth very large, inferior, beneath the projecting snout: upper lip very full, pendent, with about 5 rows of tubercles upon it: lower lip very full, moderately incised, with about 10 rows, a notch separating the upper lip from the lower, each jaw with a slightly curved cartilaginous sheath on its edge, the two parallel with each other and fitting closely together: fins small: dorsal rays 11; caudal little forked: scales 15-90-11, very much reduced forwards and subject to many irregularities: colors dusky: size small.. DISCOBOLUS, 36.

24. CATOSTOMUS NIGRICANS *Le Sueur.*

Hog Sucker. Hog Mullet. Hog Molly. Crawl-a-bottom. Stone Roller. Stone Toter. Stone Lugger.. Hammer-head. Mud Sucker.

a. Subspecies *nigricans*.

1817—*Catostomus nigricans* LE SUEUR, Journ. Ac. Nat. Sc. Phila. 102.

Catostomus nigrans (*sic*) KIRTLAND, Rept. Zool. Ohio, 168, 1838.

Catostomus nigricans DEKAY, New York Fauna, part iv, Fishes, 202, 1842.

Catostomus nigricans CUVIER & VALENCIENNES, Hist. Nat. des Poiss. xvii, 453, 1844.

Catostomus nigricans STORER, Synopsis, 421, 1846.

Hylomyzon nigricans AGASSIZ, Am. Journ. Sci. Arts, 2d series, xix, 205, 1855.

Hylomyzon nigricans PUTNAM, Bull. Mus. Comp. Zool. 10, 1865.

Hylomyzon nigricans COPE, Proc. Ac. Nat. Sc. Phila. 285, 1864.

Catostomus nigricans COPE, Journ. Ac. Nat. Sc. Phila. 236, 1868.

Catostomus nigricans GÜNTHER, Cat. Fishes Brit. Mus. vii, 17, 1868.

Catostomus nigricans COPE, Proc. Am. Philos. Soc. Phila. 468, 1870.

Hylomyzon nigricans JORDAN, Fishes of Ind. 221, 1875.

Hypentelium nigricans JORDAN, Bull. Buffalo Soc. Nat. Hist. 95, 1876.

Hypentelium nigricans JORDAN, Man. Vert. 294, 1876.

Catostomus nigricans UHLER & LUGGER, Fishes of Maryland, 138, 1876.

Hypentelium nigricans NELSON, Bull. No. 1, Ills. Mus. Nat. Hist. 48, 1876.

Hypentelium nigricans JORDAN & COPELAND, Check List, 156, 1876.

Catostomus nigricans JORDAN, Ann. Lyc. Nat. Hist. N. Y. xi, 345, 1877.

Hypentelium nigricans JORDAN & GILBERT, in Klippart's Rept. 53, 1876.

Hypentelium nigricans JORDAN, Bull. U. S. Nat. Mus. ix, 34, 1877.

Hypentelium nigricans JORDAN, Man. Vert. ed. 2d, 319, 1878.

1817—*Catostomus maculosus* LE SUEUR, Journ. Ac. Nat. Sc. Phila. 103.

Catostomus maculosus DEKAY, New York Fauna, part iv, Fishes, 203, 1842.

Catostomus maculosus CUVIER & VALENCIENNES, Hist. Nat. des Poiss. xvii, 454, 1844.

Catostomus maculosus STORER, Synopsis, 422, 1846.

Catostomus maculosus UHLER & LUGGER, Fishes of Maryland, 139, 1876.

1817—*Exoglossum macropterum* RAFINESQUE, Journ. Ac. Nat. Sc. Phila. 420.

Hypentelium macropterum RAFINESQUE, Ich. Oh. 68, 1820.

Hypentelium macropterum KIRTLAND, Rept. Zool. Ohio, 168, 1838.

Exoglossum macropterum CUVIER & VALENCIENNES, xvii, 486, 1844.

Exoglossum macropterum STORER, Synopsis, 428, 1846.

1820—*Catostomus xanthopus* RAFINESQUE, Ich. Oh. 57.

1820—? *Catostomus ? megastomus* RAFINESQUE, Ich. Oh. 59. (Most likely mythical.)

1844—*Catostomus planiceps* CUVIER & VALENCIENNES, Hist. Nat. des Poissons, xvii, 450, pl. 516.

Catostomus planiceps STORER, Synopsis, 426, 1846.

aa. Subspecies *etowanus.*

1877—*Catostomus nigricans* var. *etowanus* JORDAN, Ann. Lyc. Nat. Hist. N. Y. xi, 345.

HABITAT.—New York and Maryland to North Carolina; west to the Great Plains. Var. *etowanus* in the Alabama River. Most common in the Central Mississippi Basin; not known from the streams of the South Atlantic States, excepting the Savannah River.

This species is one of the most abundant and widely distributed of our Suckers. It abounds in rapids and shoals, especially in the larger streams, and its singular, almost comical form is familiar to every school-boy in the West. Its powerful pectoral fins render it a swifter fish in the water than any others of its family. Its habit is to rest motionless on the bottom, where its mottled colors render it difficult to distinguish from the stones among which it lies. When disturbed, it darts away very quickly, after the manner of the Etheostomoids. They often go in flocks of eight to ten. I have never yet found this species in really muddy water, and when placed in the aquarium it is one of the very first fishes to feel the influence of impure water. In my experience, it is a fish as peculiar to the clear streams as the species of *Etheostoma* or *Uranidea* are. Professor Agassiz speaks of it as the Mud Sucker, and has named it *Hylomyzon*, in allusion to its mud-loving habits. It is fortunate that that name has become a synonym, for it is certainly a misnomer.

This Sucker reaches a length of about 18 inches. It is not much valued

as food, but is often caught by boys with a spear or snare. In company with other species of *Catostomus* and *Myxostoma*, it ascends all our Western streams in April for the purpose of depositing its spawn.

The Southern form, which I have designated as var. *etowanus*, is more intensely colored and differs in some minor respects. It frequents, in great abundance, the clear tributaries of the Etowah, Oostanaula, and Coosa Rivers, in company with *Potamocottus meridionalis* (*zopherus*), a species to which the young of the *Catostomus* bears much resemblance as seen in the water.

The synonymy of this species has been well worked out by Professor Agassiz. The variations in age and appearance have given rise to a number of nominal species, most of which have, however, already been disposed of. The oldest specific name, *nigricans*, has been the one most generally employed. The generic name used depends on whether we consider this species generically distinct from the type of *Catostomus* or not. It would seem—if we may so speak—as if Nature had intended *Hypentelium* for a distinct genus, but not being an expert in generic characters, had failed to provide it with any which can stand our tests. The name *Hylomyzon*, being a simple synonym of *Hypentelium*, of course cannot be used. Rafinesque's account is much inferior to that of Professor Agassiz, and the figure given by him is one of the worst ever published, still his typical species is readily identifiable, and his name for it cannot be set aside.

Specimens in United States National Museum.

Number.	Locality.	Collector.
7644	.....	
8446	Cayuga Lake, New York	
8762	.....	
9061	.....	
9069	.....	
12295	Cincinnati, Ohio.....	J. W. Milner.
--	Ecorse, Mich.....	J. W. Milner.
15246	Bainbridge, Pa.....	T. H. Bean.
20066	Black River, Ohio	S. F. Baird.
20106	Tennessee	Beckwith.
20260	Yellow Creek, Ohio	S. F. Baird.
20270	Root River, Wisconsin	
—	Etowah River, Georgia (types of var. *etowanus*)	D. S. Jordan.
—	White River, Indiana	D. S. Jordan.
—	Savannah River	D. S. Jordan.

25. CATOSTOMUS CLARKI *Baird & Girard.*

Clark's Sucker.

1854—*Catostomus clarkii* BAIRD & GIRARD, Proc. Phila. Ac. Nat. Sc. 27.
Catostomus clarkii AGASSIZ, Am. Journ. Sc. Arts, 2d series, xix, 208, 1855.
Minomus clarkii GIRARD, Proc. Ac. Nat. Sc. Phila. 173, 1856.
Minomus clarkii GIRARD, U. S. Mex. Bound. Surv. Ichth. 38, pl. xxii, f. 5–8, 1859.
Catostomus clarkii JORDAN & COPELAND, Check List, 156, 1876.

HABITAT.—Rio Santa Cruz in Arizona.

Nothing is known of this species except from the figure given by Girard and the descriptions published by Baird and Girard. The original types of the species are not to be found in the Museum, and there are no specimens of recent collection which appear to belong to it. It seems, however, to be a valid species, related to *C. insignis*. Its lips have not been figured, hence I can only infer that it belongs to the group with a narrow upper lip.

26. CATOSTOMUS INSIGNIS *Baird & Girard.*

Spotted Sucker.

1854—*Catostomus insignis* BAIRD & GIRARD, Proc. Phila. Ac. Nat. Sc. 28, 1854.
Minomus insignis GIRARD, Proc. Ac. Nat. Sc. Phila. 173, 1856.
Minomus insignis GIRARD, U. S. Mex. Bound. Surv. Ichth. 37, pl. xxi, f. 1–4, 1859.
Catostomus insigne COPE & YARROW, Wheeler's Expl. W. 100th Mer. v, Zool. 676, 1876.
Catostomus insignis JORDAN & COPELAND, Check List, 156, 1876.

HABITAT.—Tributaries of the Rio Gila.

The original types of this species, from the Rio San Pedro, are now lost. The specimens collected by Dr. Rothrock in Ash Creek, Arizona, and referred to this species by Professor Cope, undoubtedly belong here. The species is a well-marked one, both as to form and coloration. The genus *Minomus*, of which it was made the type, appears, however, to have no tangible existence.

Specimens in United States National Museum.

Number.	Locality.	Collector.
16756	Ash Creek, Arizona	Dr. J. T. Rothrock.

27. CATOSTOMUS TERES (*Mitchill*) *Le Sueur.*

Common Sucker. White Sucker. Brook Sucker. Fine-scaled Sucker.

1803—*Le Cyprin commersonien* LACÉPÈDE, Hist. Nat. des Poiss. v, 502, 508.

Catostomus commersonii JORDAN, Man. Vert. ed. 2d, 320, 1878.

18——*Cyprinus catostomus* PECK, Mem. Am. Acad. ii, pt. 2, p. 55, pl. 2, f. 4. (Not of Forster.)

1814—*Cyprinus teres* MITCHILL, Lit. and Phil. Trans. New York, i, 458.

Catostomus teres LE SUEUR, Journ. Ac. Nat. Sc. Phila. 108, 1817.

Catostomus teres THOMPSON, Hist. Vt. 134, 1842.

Catostomus teres CUVIER & VALENCIENNES, xii, 468, 1844.

Catostomus teres STORER, Synopsis, 423, 1846.

Catostomus teres AGASSIZ, Am. Journ. Sc. Arts, 2d series, xix, 208, 1855.

Catostomus teres GÜNTHER, Cat. Fishes Brit. Mus. vii, 15, 1868.

Catostomus teres COPE, Proc. Am. Philos. Soc. Phila. 468, 1870.

Catostomus teres JORDAN, Fishes of Ind. 221, 1875.

Catostomus teres JORDAN, Man. Vert. 293, 1876.

Catostomus teres NELSON, Bull. No. 1, Ills. Mus. Nat. Hist. 48, 1876.

Catostomus teres JORDAN & COPELAND, Check List, 156, 1876.

Catostomus teres JORDAN & GILBERT, in Klippart's Rept. 53, 1876.

Catostomus teres JORDAN & GILBERT, in Klippart's First Report Ohio Fish Commission, 84, pl. xii, f. 18–19, 1877.

Catostomus teres JORDAN, Bull. U. S. Nat. Mus. ix, 37, 1877.

1817—*Catostomus communis* LE SUEUR, Journ. Ac. Nat. Sc. Phila. i, 95.

Catostomus communis DEKAY, New York Fauna, part iv, Fishes, 196, 1842.

Catostomus communis CUVIER & VALENCIENNES, Hist. Nat. des Poissons, xvii, 426, 1844.

Catostomus communis KIRTLAND, Boston Journ. Nat. Hist. v, 265, 1845.

Catostomus communis STORER, Synopsis, 421, 1846.

Catostomus communis COPE, Journ. Ac. Nat. Sc. Phila. 236. 1868.

Catostomus communis UHLER & LUGGER, Fishes of Maryland, 138, 1876.

1817—*Catostomus bostoniensis* LE SUEUR, Journ. Ac. Nat. Sc. Phila. 106.

Catostomus bostoniensis STORER, Rept. Ich. Mass. 84, 1838.

Catostomus bostoniensis CUVIER & VALENCIENNES, Hist. Nat. des Poissons, xvii, 432, 1844.

Catostomus bostoniensis STORER, Synopsis, 423, 1846.

Catostomus bostoniensis PUTNAM, Bull. Mus. Comp. Zool. 10, 1863.

Catostomus bostoniensis GILL, Canadian Nat. p. 19, Aug. 1865.

Catostomus bostoniensis STORER, Hist. Fishes Mass. 290, pl. xxii, f. 3, 1867.

Catostomus bostoniensis THOREAU, Week on Concord and Merrimack, 38, 1868.

1820—*Catostomus flexuosus* RAFINESQUE, Ich. Oh. 59.

1823—*Catostomus hudsonius* RICHARDSON, Franklin's Journal, 717, 1823. (Not of Le Sueur.)

Cyprinus (Catostomus) hudsonius RICHARDSON, Fauna Bor.-Am. Fishes, 112, 1836. (Excl. syn.)

1836—*Cyprinus (Catostomus) reticulatus* RICHARDSON, Fauna Bor.-Am. Fishes, 303.

1838—*Catostomus gracilis* KIRTLAND, Rept. Zool. Ohio, 168.

1838—*Catostomus nigricans* STORER, Rept. Ich. Mass. 86. (Not of Le Sueur.)

Catostomus nigricans THOMPSON, Hist. Vermont, 135, 1842.

1842—*Catostomus pallidus* DEKAY, New York Fauna, part iv, Fishes, 200.

Catostomus pallidus STORER, Synopsis, 426, 1846.

1844—*Catostomus aureolus* CUVIER & VALENCIENNES, Hist. Nat. des Poiss. xvii, 439. (Not of Le Sueur.)

Catostomus aureolus GÜNTHER, Cat. Fishes Brit. Mus. vii, 16, 1868.

1850—*Catostomus forsterianus* AGASSIZ, Lake Superior, 358.

1855—*Catostomus forsterianus* AGASSIZ, Am. Journ. Sc. Arts, 2d series, xix, 208.

Acomus forsterianus GIRARD, Proc. Ac. Nat. Sc. Phila. 173, 1856.

1856—*Catostomus sucklii* GIRARD, Proc. Ac. Nat. Sc. Phila. 175.

Catostomus sucklii GIRARD, U. S. Pac. R. R. Expl. x, pl. li, 226, 1858.

Catostomus sucklii COPE, Hayden's Geol. Surv. Wyoming, 1870, 434, 1872.

Catostomus suckleyi JORDAN & COPELAND, Check List, 156, 1876.

1860—? *Catostomus texanus* ABBOTT, Proc. Ac. Nat. Sc. Phila. 473.

? *Catostomus texanus* JORDAN & COPELAND, Check List, 156, 1876.

1860—*Catostomus chloropteron* ABBOTT, Proc. Ac. Nat. Sc. Phila. 473.

Catostomus chloropterum COPE, Proc. Ac. Nat. Sc. Phila. 85, 1865.

Catostomus chloropterus JORDAN & COPELAND, Check List, 156, 1876.

1876—*Catostomus alticolus* COPE & YARROW, Wheeler's Expl. W. 100th Mer. v, Zool. 677.

Catostomus alticolus JORDAN & COPELAND, Check List, 156, 1876.

1876—*Moxostoma trisignatum* (COPE) COPE & YARROW, Wheeler's Expl. W. 100th Mer. v, Zool. 679.

Erimyzon trisignatus JORDAN & COPELAND, Check List, 157, 1876.

HABITAT.—All streams from Labrador to Florida and westward to the Rocky Mountains. Everywhere abundant. The most widely distributed of the *Catostomidæ*.

This species is the commonest of all the Suckers in nearly every stream east of the Rocky Mountains. In Canada, in New England, in the Great Lakes, in the Mississippi Valley, in South Carolina, in Georgia, in Alabama, it is everywhere the commonest Sucker, and it certainly occurs in Dakota, Nebraska, Kansas, Colorado, and Texas, though how abundantly I am unable to say.

This species is everywhere the one to which the name of "Sucker" primarily belongs, the other species, though often called "Sucker", as a sort of general term, receiving the special names of Red Horse, Buffalo, Mullet, Chub Sucker, etc.

This species is subject to considerable variations in different waters. In shaded brooks, it is dark-colored and rather slender. In open or muddy waters, it becomes pale. In the Great Lakes, it often reaches a considerable size and a proportional stoutness of body. The adult is usually uniformly colored above. Young fishes 1½ to 3 inches in length are often variegated, and sometimes show three or four lateral dark

blotches, which are sometimes confluent into an irregular dusky band. Such little fishes usually have the lateral line imperfect. On such, the nominal species *Moxostoma trisignatum* was based.

The male fishes in the spring show a more or less distinct pinkish or rosy lateral band. The males and females ascend the small streams in the spring for the purpose of depositing their spawn. The coincidence of their times of migration with that of some of the early settlers of Illinois, who used to come up from New Orleans in the spring, returning in the fall, has given to the natives of that State the slang name of "Suckers", as natives of Michigan were called "Wolverenes"; of Minnesota, "Gophers"; of Wisconsin, "Badgers"; of Indiana, "Hoosiers"; of Ohio, "Buckeyes"; and of Missouri, "Pukes".

I have elsewhere adopted the name "*commersoni*" for this species, inasmuch as there is little doubt that it is the "*Cyprin commersonien*"* of Lacépède, as has long since been noticed by Valenciennes.

Dr. Günther quotes, in the synonymy of *Catostomus teres*, "*Cyprinus commersonnii* Lacépède"; but, on examination of Lacépède's work, I am unable to find that he uses the name *commersoni*, or in fact any classical name whatever for the species, and as priority of date can hardly be claimed for a French name like "*Cyprin commersonien*", I am compelled to fall back on Mitchill's very appropriate name *teres* for the species. The identity of *C. teres* of Mitchill, *C. communis* and *C. bostoniensis* of Le Sueur, *C. reticulatus* of Richardson, *C. gracilis* of Kirtland, and *C. pallidus* of DeKay has been long since shown, and has been generally admitted by late writers. *C. nigricans* of Storer and Thompson, from the Connecticut, is evidently the dusky brook form of this species, and not the true *nigricans* of Le Sueur. It is equally evident that the species called *C. aureolus* by Valenciennes and Günther is the present one and not *Myxostoma aureolum*. Agassiz's *Catostomus forsterianus* is doubtless the common lake form of *C. teres*, as indicated by Dr. Günther. The

* The following is Lacépède's description of his "*Le Cyprin Commersonien*":—

"Onze rayons à la dorsale; huit à la nageoire de l'anus; dix à chaque ventrale; huit ou neuf à chaque pectorale; la nageoire du dos et celle de l'anus quadrilatères; l'anal étroite; l'angle de l'extrémité de cette dernière nageoire très aigu; la caudale en croissant; la ligne latérale droite; la machoire supérieure plus avancée que celle d'en bas; les écailles arrondies et très petites.

"Le commersonien, dont nous publions les premiers la description, et que le savant Commerson a observé, présente un double orifice pour chaque narine; sa tête est dénuée de petites écailles; ses ventrales et ses pectorales sont arrondies à leur extrémité; la dorsale s'élève vers le milieu de la longueur totale de la poisson."

types of *C. sucklii* are lost, but *C. teres* occurs in the Upper Missouri region, and Girard's description hints at no specific difference. *Catostomus chloropteron* Abbott is evidently the same. *Catostomus texanus* Abbott, described from a dried specimen, is less clear, but what there is of specific characterization in the description points to *C. teres*. The dorsal carination is frequently observed in stuffed fishes in which some flesh is left in the back to shrink in drying, leaving the back "carinated".

I have examined several of the types of *Catostomus alticolus* Cope. They are all small fishes, not one-fourth grown, and, as usual in young fishes, the head appears proportionally large. I see, however, no reason for considering them different from *Catostomus teres*. *Moxostoma trisignatum* I have already referred to. The absence of the lateral line is due to their youth, not to their belonging to a different genus. The three large lateral spots, "not seen in any other of the order," are found on young specimens of *Catostomus* generally. I have examined the types of "*Moxostoma trisignatum*", and have found specimens of similar size, similarly colored and without lateral line, from Michigan and from other Western States. I would undertake to match them from any stream in the West. The reference of these specimens to *Moxostoma* (*Erimyzon*) was probably the result of a very hasty examination.

Specimens in United States National Museum.

Number.	Locality.	Collector.
1592	Carlisle, Pa	S. F. Baird.
6239	Maryland	Dr. Kennerly.
6853	Summerville, S. C	
7067	Lake Champlain	S. F. Baird.
7607	Marietta, Ohio	Prof. Andrews.
7677		
7678		
7706		
7707		
7717		
7777		
7781		
8329	Port Huron, Mich	
8409		
8440		
8451		
8489	Racine, Wis	
8501		
8573	Toronto, Canada	

Specimens in United States National Museum—Continued.

Number.	Locality.	Collector.
8664		
8671		
8689		Barry.
8728	Huron River, Michigan	S. F. Baird.
8759		
8834	Oswego, N. Y	
8870	Alabama	
8927		
8984		
9041	Missouri (?)	Barry.
9054		
9059		
9157		
9170		
9182	Pembina, Red River of the North	R. Kennicott.
9195	Aux Plaines River, Illinois	R. Kennicott.
9207	Lake Champlain	
9393	Écorse, Mich	G. Clark.
9404	Abbeville, S. C	
9503	Mississippi Valley	
9646		
9875	Black River	S. F. Baird.
10540	Lake Superior	J. W. Milner.
11146	Sandusky, Ohio	J. W. Milner.
11147	Sandusky, Ohio	J. W. Milner.
11148	Sandusky, Ohio	J. W. Milner.
12320	Potomac River	J. W. Milner.
12915	Twin Lakes, Colorado (*alticolus*)	J. T. Rothrock.
12936	South Hadley Falls, Mass	J. W. Milner.
12937	South Hadley Falls, Mass	J. W. Milner.
12939	South Hadley Falls, Mass	J. W. Milner.
12940	South Hadley Falls, Mass	J. W. Milner.
15356	Bainbridge, Pa	T. H. Bean.
15777	Twin Lakes, Colorado (types of *alticolus*)	J. T. Rothrock.
17099	Arkansas River, Pueblo, Col. (types of *trisignatum*)	C. E. Aiken.
18258	Potomac River	G. B. Goode.
18259	Potomac River	G. B. Goode.
20010	Yellow Creek, Ohio	S. F. Baird.
20057	Brownsville, Tex	
20097	Sing Sing, N. Y	S. F. Baird.
20194 20195	Northern Boundary Survey, Dakota	Dr. Elliott Coues.

Specimens in United States National Museum—Continued.

Number.	Locality.	Collector.
20241	Piermont, N. Y	S. F. Baird.
20238	Madison, Wis	S. F. Baird.
20256		
20262	Quebec, Canada	S. F. Baird.
20266	Fox River, Wisconsin	S. F. Baird.
20267	Sing Sing	S. F. Baird.
20268	Root River, Wisconsin	S. F. Baird.
20316		
20344	Potomac River	Goode & Bean.
20377	Potomac River	House.
20382	Platte Valley, Nebraska	
20454	Wilkesbarre, Pa	L. H. Taylor.
—	Etowah River, Georgia	D. S. Jordan.
—	Saluda River, South Carolina	D. S. Jordan.
20918	Fort Bridger, Wyoming	

28.* CATOSTOMUS MACROCHILUS *Girard.*

Large-lipped Suc'er.

1856—*Catostomus macrocheilus* GIRARD, Proc. Ac. Nat. Sc. Phila. 175.
Catostomus macrocheilus GIRARD, U. S. Pac. R. R. Expl. x, 225, 1858.
Catostomus macrochilus GÜNTHER, Cat. Fishes Brit. Mus. vii, 20, 1868.
Catostomus macrochilus JORDAN & COPELAND, Check List, 156, 1876.

HABITAT.—Columbia River.

Only the original type of this species is known. It is an adult specimen, well preserved. Although this species seems closely related to *C. occidentalis*, I am disposed to consider it distinct, as the mouth is notably larger than in any *occidentalis* which I have seen. The examination of a large series of specimens may, however, render it necessary to unite them.

Specimens in United States National Museum.

Number.	Locality.	Collector.
240	Astoria, Oregon (type *macrochilus*)	Lieut. Trowbridge.

*For 28 (*b*). *Catostomus fecundus* Cope & Yarrow, see Addenda, p. 219.

29. CATOSTOMUS OCCIDENTALIS *Ayres.*

Western Sucker.

1854—*Catostomus occidentalis* AYRES, Proc. Cal. Ac. Nat. Sc. i, 18.

Catostomus occidentalis AGASSIZ, Am. Journ. Sc. Arts, 2d series, xix, 209, 1855. (Described as a new species.)

Catostomus occidentalis GIRARD, Proc. Ac. Nat. Sc. Phila. 174, 1856.

Catostomus occidentalis GIRARD, U. S. Pac. R. R. Expl. x, 224, 1858.

Catostomus occidentalis GÜNTHER, Cat Fishes Brit. Mus. vii, 17, 1868.

Catostomus occidentalis JORDAN & COPELAND, Check List, 156, 1876. (Name only.)

1856—? *Catostomus bernardini* GIRARD, Proc. Ac. Nat. Sc. Phila. 175.

? *Catostomus bernardini* GIRARD, U. S. Mex. Bound. Ichth. 40, pl. 23, f. 1–5, 1859.

? *Catostomus bernardini* GÜNTHER, Cat. Fishes Brit. Mus. v. 7, 17, 1868.

HABITAT.—Streams west of the Rocky Mountains, probably generally distributed.

This species was described almost simultaneously under the same name by Dr. Ayres and Professor Agassiz. Since then it has been little noticed by ichthyologists, and its distribution has remained uncertain. The few specimens in the National Museum indicate, however, a wide distribution. I have here united *Catostomus bernardini* Girard to *C. occidentalis*. The single specimen made the type of *C. bernardini* is lost, so that we can probably never know exactly for what the author intended the name. The size of the dorsal and the form of the mouth as given in Girard's figure indicate a species of *Catostomus* rather than *Pantosteus*, and as I am unable to distinguish it from *C. occidentalis*, I let it fall into the synonymy. The scales of *C. bernardini* as *figured* seem, however, smaller than usual in *C. occidentalis*.

C. occidentalis is apparently related to *C. teres*, but is distinguished by the form of mouth and by the somewhat smaller scales. The species is "brought to the market in San Francisco, and is said to be quite common in the Sacramento and San Joaquin Rivers."—(GIRARD.)

Specimens in United States National Museum.

Number.	Locality.	Collector.
15527	Green River, Wyoming	Livingston Stone.
20814	McLeod River, California	Livingston Stone.

30. CATOSTOMUS LABIATUS *Ayres.*

Thick-lipped Sucker.

1855—*Catostomus labiatus* AYRES, Proc. Cal. Ac. Nat. Sc. i, 32.
Catostomus labiatus GIRARD, Proc. Ac. Nat. Sc. Phila. 175, 1856.
Catostomus labiatus GIRARD, U. S. Pac. R. R. Expl. x, 224, 1858.
Catostomus labiatus JORDAN & COPELAND, Check List, 156, 1876.

HABITAT.—Streams of Oregon (Klamath Lake).

I have seen only the specimen from which Girard's description was taken. Like *macrochilus*, this species appears distinct from *occidentalis*, but the examination of a larger series of specimens is necessary to prove it. At present, it appears to differ from *macrochilus* and *occidentalis* in the smaller size of the dorsal fin.

Specimens in United States National Museum.

Number.	Locality.	Collector.
239	Klamath Lake, Oregon	Dr. John S. Newberry.

31. CATOSTOMUS ARÆOPUS *Jordan*, sp. nov.

Hard-headed Sucker.

1878—*Catostomus arœopus* JORDAN, MSS., Wheeler's Report Surv. W. 100th Mer. (*ined.*).

This species represents *C. discobolus* in the section *Decadactylus*. Its very narrow fontanelle and sheathed lips indicate its close relation to *Pantosteus*. The specific name is from αραιὸς, small, thin; ὀπὴ, hole or aperture. The typical specimens were from Kern River, California.

Specimens in United States National Museum.

Number.	Locality.	Collector.
17107	Kern River, Cal. (type)	H. W. Henshaw.
17103	Carson River, Nevada	H. W. Henshaw.

32. CATOSTOMUS TAHOENSIS *Gill & Jordan.*

Sucker of Lake Tahoe.

1868—*Acomus generosus* COOPER, Cronise's Nat. Wealth Cal. 495. (Not of Girard.)
1878—*Catostomus tahoensis* GILL & JORDAN, Bull. U. S. Nat. Mus. xi, p. —.

HABITAT.—Lake Tahoe, Nevada.

The Sucker of Lake Tahoe is closely related to *Catostomus longirostris*, but seems to differ constantly in the shorter head and more contracted

body. It is said to be very abundant in Lake Tahoe. "They are caught in nets and sometimes with the hook, but like all this family are rather poor as food" (*Cooper*). *Acomus generosus* of Girard, with which this species has been identified, is a very different species, belonging to a different genus.

Specimens in United States National Museum.

Number.	Locality.	Collector.
5240	Lake Tahoe (types *C. tahoensis*)	J. G. Cooper.
17109	Lake Tahoe	H. W. Henshaw.

33. CATOSTOMUS ROSTRATUS (*Tilesius*) *Jordan.*

Siberian Sucker.

1813—"*Cyprinus rostratus* TILESIUS, Mém. Ac. Sc. St. Pétersbourg, iv, p. 454, tab. 15, figs. 1-2, 1813."

Cyprinus rostratus PALLAS, Zoogr. Rosso-Asiat. iii, 308.

Cyprius rostratus GÜNTHER, Cat. Fishes Brit. Mus. xii, 12, 1868. (As doubtful species of *Catostomus*.)

1844—*Catostomus tilesii* CUVIER & VALENCIENNES, Hist. Nat. des Poissons, xvii, 469, 1844.

HABITAT.—Eastern Siberia.

No writer since Tilesius seems to have observed this fish. It is, however, unquestionably a species of *Catostomus*, allied to and perhaps even identical with *C. longirostris*. The following is Tilesius's description of this species, as quoted by Pallas:—

"Descriptio *Cyprini rostrati* Tungusis ad Covymam fluv., Tschukulschan et Jucagiris Onatscha dicti. Tab. XV, Fig. 1-5. (*Der Rüffelkarpfen, Rampkopf.*)

"*Magnitudo* in adultis pedem superat, sed trium spithamarum longitudinem vix attingit. *Caput* osseum longum antico rostro descendente truncatum e quino simile quam ob rem Ruthenis.

"*Koub* dicitur aliis Prodnst, quoniam os subtus, ut In (*sic*) Cotto cataphracto vel Agono accipenserino, sed rictus oris vel orificium lunatum non amplum sed angustum labiis crassis pinguibus marginatum, labium anterius fornicatum, ambitu semicirculare ossibus labialibus vel mystaceis ad frænum oris descendentibus arcuatis lateraliter lectum, labium posterius minus, rectum, ab anteriori inclusum amplexum papillis numerosissimis granulatum.

"*Oculi* lateralis a rostro remoti operculo posteriori branchiali approximati ovales, iridibus aureis superne angustioribus, pupilla supra centrum posita. *Nares* ad marginem orbitæ anteriorem duplices in sulco profundo osseo. *Operculo branchialia* trilamellata, *lamella anterior* cum ossibus maxillæ superioris conjuncta ellyptica angusta ad orbitæ marginem anteriorem ascendens inferius lamellæ *secundæ* tenerrimæ angustiori orbitam inferiorem formanti imposita, lamina ossea subjacens, operculum

medium formans, subtus plica isthmo juguli adnata, carne tegitur suborbitali. *Lamina posterior* maxima latissima ossea conchæ adinstar fornicata, anterius cum obitæ margine posteriori juncta. *Membrana branchiostega* triradiata inter operculi laminam anteriorem subtus utrinque approximatam coarcta et in isthmo gulæ conjuncta. *Corpus* oblongum erectum microlepidotum, squamis lævibus subtilissime radiato-striatis oblongis, ad caput minoribus versus anum et caudam majoribus imbricatum crassiusculum leviter compressum, ventre-dorsusque convexum. *Linea lateralis* recta versus medium corporis paululum descendens per seriem squamarum postice incisarum expressa versus caudam magis conspicua. *Color* in dorso atro cœruleus nitidus, versus latera subargenteus, subtus albens. *Pinnæ pectorales* quatuordecim radiatæ, radii medii longissimi, *ventrales* decemradiatæ, radia primo osseo acuminato, *dorsalis* decemradiata et duodecimradiata, radio primo cum adminiculo radicali, ultimo brevissimo ad basin usque fisso, omnibus ad apices quadrifidis, dorsalis pinna ventralibus opposita, analis p. septemradiata, radio primo simplici cum adminiculo radicali, reliquis quadrifidis, tertio longissimo septimo brevissimo. *Caudalis pinna* bifurca lacinia inferior paulo major undecimradiata, superior novemradiata tota pinna viginti radiis suffulta extremis lateralibus cum adminiculo radicali connatis. Radii pennarum ad extremitatis quadrifidi et extremi ad radices duplicati vel ex binis truncis connati, quam ab rem primus dorsalis longitudinaliter ad basin sulcatus est, quod etiam in primo analis et caudalibus extremis fere ex tribus compositis cernitur. In dorsali et anali pinna radii valde distant, pectorales ventrales et analis pinnæ aureo-rubescentes et ad basin prominentes, pectorales adeo tuberosæ, ventralium radices per membranosam laminam triangularem squamatam obteguntur. Anus caudæ propior. Interna non exploravi. Characteribus cæterum generis cyprinacei ore nimirum edentulo, dentibus post branchialibus, membrana branchiostega triradiata utrinque instructus est. A celeberrimo *Merck* plura specima ex siccata ex Covymæ fluvio allata sunt, quæ nominæ Tschukutschan designata sunt. Annotavit simul idem, 'piscem in Lena et Indigirca ejusque collaterali lapidoso Dogdo fluviis copiosum esse sed propter nationis velocitatem captu difficilem esse et non nisi in cœcis fluminum ramis hamo capi, gregatim et velocissime natare, sapidissimum cæterum, excepto vere, cum, ova spargunt nec aristis impeditum piscem esse, attamen ab accolis Covymæ et Indigircæ (qui caput tantem in deliciis habet, reliqua canibus cedunt) non multum æstimari.'"—(PALLAS, *Zoographia Rosso-Asiatica*, pp. 308–310.)

34. CATOSTOMUS LONGIROSTRIS *Le Sueur*.

Long-nosed Sucker. Northern Sucker. Red-sided Sucker.

1773—"*Cyprinus catostomus* FORSTER, Philos. Trans. lxiii, 155, tab. 6, 1773."
Cyprinus catastomus SCHNEIDER, ed. Bloch, 444, 1802.

1817—*Catostomus longirostrum* LE SUEUR, Journ. Ac. Nat. Sc. Phila. 102.
Catostomus longirostrum THOMPSON, Hist. Vt. 135, 1842.
Catostomus longirostris DEKAY, New York Fauna, part iv, Fishes, 203, 1842.
Catostomus longirostrum CUVIER & VALENCIENNES, xvii, 453, 1844.
Catostomus longirostrum STORER, Synopsis, 421, 1846.
Catostomus longirostrum JORDAN & COPELAND, Check List, 156, 1876.
Catostomus longirostris JORDAN & GILBERT, in Klippart's Rept. 53, 1877.

1817—*Catostomus hudsonius* LE SUEUR, Journ. Ac. Nat. Sc. Phila. 107.

Catostomus hudsonius CUVIER & VALENCIENNES, Hist. Nat. des Poissons, xvii, 459, 1844.

Catostomus hudsonius STORER, Synopsis, 419, 1846.

Catostomus hudsonius AGASSIZ, Am. Journ. Sc. Arts, 2d series, xix, 208, 1855.

Catostomus hudsonius GÜNTHER, Cat. Fishes Brit. Mus. vii, 13, 1868.

Catostomus hudsonius JORDAN, Man. Vert. 293, 1876.

Catostomus hudsonius NELSON, Bull. No. 1, Ills. Mus. Nat. Hist. 48, 1876.

1823—*Catostomus forsterianus* RICHARDSON, Franklin's Journal, 720.

Catostomus forsterianus RICHARDSON, Fauna Bor.-Amer. iii, Fishes, 116, 1836.

Catostomus forsterianus DEKAY, New York Fauna, part iv, Fishes, 203, 1842.

Catostomus forsterianus CUVIER & VALENCIENNES, Hist. Nat. des Poissons, xvii, 463, 1844.

Catostomus forsterianus STORER, Synopsis, 419, 1846.

Acomus forsterianus GIRARD, Proc. Ac. Nat. Sc. Phila. 172, 1856.

Catostomus forsterianus PUTNAM, Bull. Mus. Comp. Zool. 10, 1863.

Catostomus forsterianus JORDAN & COPELAND. Check List, 156, 1876.

1850—*Catostomus aurora* AGASSIZ, Lake Superior, 360, pl. 2, f. 3–4.

Acomus aurora GIRARD, Proc. Ac. Nat. Sc. Phila. 173, 1856.

Catostomus aurora PUTNAM, Bull. Mus. Comp. Zool. 10, 1863.

1856—*Acomus griseus* GIRARD, Proc. Ac. Nat. Sc. Phila. 174.

Acomus griseus GIRARD, U. S. Pac. R. R. Expl. x, 222, pl. xlix, 1858.

Catostomus griseus GÜNTHER, Cat. Fishes Brit. Mus. vii, 14, 1868.

Catostomus griseum COPE, Hayden's Geol. Surv. Wyoming, 1870, 434, 1872.

Catostomus griseus JORDAN & COPELAND, Check List, 156, 1876.

1856—*Catostomus lactarius* GIRARD, Proc. Ac. Nat. Sc. Phila. 174.

Acomus lactarius GIRARD, U. S. Pac. R. R. Expl. x, 223, 1858.

Catostomus lactarius JORDAN & COPELAND, Check List, 156, 1876.

HABITAT.—New England to Nebraska and north to Alaska and the Arctic Sea. Extremely abundant in British America and along the northern boundaries of the United States, but not found south of 40° north latitude.

This is another of our numerous species which have an extremely wide range of distribution and a considerable range of variation. It has been longer known than any other of the Suckers. The oldest specific name given was that of *catostomus*, which, however, had to be set aside when the generic name *Catostomus* was proposed for it. The next name in order of time is the very appropriate one of *longirostrum* Le Sueur (more properly spelled *longirostris*), given to some specimens from Vermont. Five pages later, the name *hudsonius* was given as a substitute for *catostomus* of Forster. The slight priority of *longirostrum* over *hudsonius*, however, seems to entitle it to preference, although the latter name has been most frequently used. Later, specimens considered by Dr. Günther to be identical with *hudsonius* received from Richardson the name "*forsterianus*", and, still later, the name *forsterianus* was, without evident reason, transferred from this species to *teres* by Professor Agassiz, who

gave to this species the name of *aurora*, in allusion to the red breeding colors of the male. Western specimens were still later described by Girard as two distinct species, *griseus* and *lactarius*, apparently without comparison with the Eastern forms.

The examination of the large series of specimens noticed below, together with others from the Great Lakes and Upper Mississippi, has convinced me that all belong to one species, variable to some degree, but not more so than is *Catostomus teres* and less so than *Erimyzon sucetta*. Some of the Upper Missouri specimens referable to *C. griseus* Grd. have on an average rather smaller scales (95 in the lateral line instead of 100 to 110); but I am unable to distinguish a tangible variety. The original types of *C. lactarius* Girard are not now to be found, but the description indicates no difference from *C. longirostris*.

Specimens in United States National Museum.

Number.	Locality.	Collector.
1054	Lake Superior	J. W. Milner.
2087	Puget's Sound	R. Kennicott.
2563	Platte River, Nebraska	Capt. Simpson.
6709	Youghiogheny River	Prof. Andrews.
7047	Lake Winnipeg	R. Kennicott.
7640		
7993	Nulato, Youcon River, Alaska	W. H. Dall.
8136		
8435		
8437	Essex County, New York	
8802	Quebec	S. F. Baird.
8905	Great Slave Lake	R. Kennicott.
9010	Pole Creek, Nebraska	Lieut. Wood.
9116		
9175		
9522	Saint Michael's, Alaska	Dr. Bannister.
11212	Au Sable River, Michigan	J. W. Milner.
11213	Au Sable River, Michigan	J. W. Milner.
12210	Au Sable River, Michigan	J. W. Milner.
20075	Racine, Wis	
20191	Northern Boundary Survey, Dakota	Dr. Elliott Coues.
20223	Racine, Wis	S. F. Baird.
20235	Lake Superior	J. W. Milner.
20257	(Probably original types of *griseus;* the old number and locality obliterated.)	Bowman.
20292	Platte River, Nebraska	
20689	Great Lakes	

35. CATOSTOMUS RETROPINNIS *Jordan*, sp. nov.

1878—*Catostomus retropinnis* JORDAN, Bull. Hayden's Geol. Surv. Terr. (*ined.*).

This fine species combines the mouth of *C. latipinnis* with the form and general characters of *C. longirostris*. The type is No. 21,197, collected by Dr. Elliott Coues in Milk River, Montana. It is a male specimen 16¾ inches in length. A specimen previously examined from Platte Valley was identified as probably the female of *C. latipinnis*, but the discovery of this large male specimen forbids such a supposition.

Specimens in the United States National Museum.

Number.	Locality.	Collector.
20933	Platte Valley	
21197	Milk River, Montana (type)	Dr. Elliott Coues.

36. CATOSTOMUS LATIPINNIS *Baird & Girard.*

Great-finned Sucker.

1853—*Catostomus latipinnis* BAIRD & GIRARD, in Proc. Ac. Nat. Sc. Phila. vi, 388.

Acomus latipinnis GIRARD, Proc. Ac. Nat. Sc. Phila. 173, 1856.

Acomus latipinnis GIRARD, U. S. Mex. Bound. Surv. Ichth. 39, pl. xxiv, f. 1–6, 1859.

Catostomus latipinnis GÜNTHER, Cat. Fishes Brit. Mus. vii, 14, 1868.

Catostomus latipinnis COPE, Hayden's Geol. Surv. Wyoming, 1870, 434, 1872.

Catostomus latipinnis JORDAN & COPELAND, Check List, 156, 1876.

1856—*Catostomus guzmaniensis* GIRARD, Proc. Ac. Nat. Sc. Phila. 173.

Acomus guzmaniensis GIRARD, U. S. Mex. Bound. Surv. Ichth. 39, pl. xxiii, f. 6–10, 1859.

Catostomus guzmaniensis GÜNTHER, Cat. Fishes Brit. Mus. vii, 15, 1868.

Catostomus guzmaniense COPE & YARROW, Wheeler's Expl. W. 100th Mer. v, Zool. 679, 1876.

Catostomus guzmaniensis JORDAN & COPELAND, Check List, 156, 1876.

HABITAT.—Arizona and Sonora. Green River, Wyoming (*Cope*). Probably not abundant.

This species is one of the most strongly marked of our Suckers. The male fish may be known at once by the slender form and excessive development of the fins, and probably in the females the fins are more developed than in the males of any of the related species. The squama-

tion also is peculiar, and the form of the mouth is unlike that of any other species. These features are all well shown in Girard's figure of the species in the Ichthyology of the Mexican Boundary.

The distribution of the species has not been well made out. I have seen but one specimen, an adult male from the Gila region, apparently the one from which Girard's figure was made.

The type of *Catostomus guzmaniensis* cannot be found. The figure was made from a young fish, and the distinctions between it and *latipinnis* are such as often distinguish a young fish from an old one. It is better, therefore, to unite the two than to admit an insufficiently characterized nominal species.

Specimens in United States National Museum.

Number.	Locality.	Collector.
20078	(Type of *latipinnis* undoubtedly, but the locality, Rio San Pedro, tributary of Rio Gila, and old number, 254 ?, obliterated.)	J. H. Clark.

37. CATOSTOMUS DISCOBOLUS *Cope.*

Large-lipped Sucker.

1872—*Catostomus discobolus* COPE, Hayden's Geol. Surv. Wyo. 1870, 435.

Catostomus discobolus COPE & YARROW, Wheeler's Expl. W. 100th Mer. v, Zool. 677, 1876.

Catostomus discobolus JORDAN & COPELAND, Check List, 156, 1876.

HABITAT.—Idaho to Arizona.

This interesting species is a *Pantosteus* in all but the technical character of the open fontanelle, and in this respect it is really intermediate, as the fontanelle, in the adult at least, is reduced to a narrow slit. The characters given in the analysis were taken from the Snake River specimen, 20,475, larger and in better condition than most or all of those examined by Professor Cope. Professor Cope's original types came from Green River in Wyoming.

Specimens in United States National Museum.

Number.	Locality.	Collector.
12914	.....	Newberry.
15783	Zuñi, N. Mex	Yarrow & Henshaw.
15791	Arizona	C. G. Newberry.
20475	Snake River, Idaho	F. V. Hayden.

Genus PANTOSTEUS *Cope.*

Minomus COPE, U. S. Geol. Surv. Wyoming, 1870, 434 (1872). (Not of Girard.)
Pantosteus COPE, Lieut. Wheeler's Expl. W. 100th Mer. v, 673, 1876.
Catostomus, Acomus et Minomus sp. GIRARD.

Type, *Minomus platyrhynchus* Cope.

Etymology, πᾶν, all; ὀστέον, bone (from the closing of the fontanelle by bone).

Head moderate or rather small, 4 to 5 times in length of body, flattish and rather broad above, anteriorly somewhat pointed; eye rather small, usually behind the middle of the head: suborbital bones narrow, as in *Catostomus;* bones of head rather thick, the two parietal bones firmly united, entirely obliterating the fontanelle.

Mouth rather large, entirely inferior; each jaw with a more or less developed cartilaginous sheath, separable in alcohol, essentially as in *Chondrostoma, Acrochilus,* and related genera; upper lip broad, papillose, with a rather broad, free margin, and several series of tubercles; lower lip largely developed, with an extensive free margin deeply incised behind, but less so than in *Catostomus.* Pharyngeal bones and teeth essentially as in *Catostomus.* Isthmus quite broad.

Body generally elongate, subterete, and little compressed.

Scales quite small, from 80 to 105 in the course of the lateral line, and 30 to 35 in a cross-series between dorsal and ventrals, usually more or less reduced in size and crowded forward, as in *Catostomus;* lateral line well developed, straightish.

Fins generally rather small; first ray of dorsal usually about midway of body, its rays few, 9 to 12 in number; ventrals inserted rather under posterior part of dorsal, their rays 10 or 9; anal short and high, with 7 developed rays; caudal rather shallow, emarginate; pectorals well developed: air-bladder with two chambers.

The characters of *Pantosteus* are essentially those of *Catostomus,* except that the fontanelle is obliterated. The usual scale-formula is interme-

diate between that of *Catostomus* proper and that of the subgenus *Decadactylus*.

The genus was first indicated by Professor Cope in 1874, under the name of *Minomus*, he supposing at the time that *Catostomus insignis*, the type of Girard's *Minomus*, was a species with closed fontanelle. On obtaining specimens of *C. insignis*, it became evident that such was not the case, and the new name *Pantosteus* was proposed for the genus. *Pantosteus* runs very close to *Catostomus*, two species referred to the latter genus (*C. discobolus* and *C. arœopus*) being almost intermediate.

Generic Characterizations.

MINOMUS Cope, 1872.—"I have proposed to adopt as valid (Proc. Amer. Philos. Soc. 1870, 480) seven genera of this family. I will now add an eighth, which embraces species which combine with the characters of *Catostomus* proper, a complete union of the parietal bones, which obliterates the fontanelle so universal among the suckers. The only other exception is seen in *Cycleptus*, Raf., as I have already mentioned. In all the members of the family where I have examined it, this fontanelle is quite open and of no doubtful proportions, and nowhere reduced to the slit so often seen in *Siluridæ*. In searching for the characters of Girard's so-called genera *Minomus* and *Acomus*, I find that the type of the former, *M. insignis*, B. G., presents the character above mentioned. I therefore adopt his name for the new genus, and add two new species, *M. delphinus* and *M. bardus*. Whether his two other species, *M. plebcius* and *M. clarkii*, belong to it is uncertain as yet, but they have the same physiognomy."—(COPE, *Hayden's Geol. Surv. Wyoming for* 1870, p. 434, 1872.)

PANTOSTEUS (Cope) Yarrow, 1876.—"Professor Cope, in 1870, purposed to adopt as valid seven genera of this family; but in 1872, he stated his belief that an eighth should be added, which should embrace species combining the characters of *Catostomus* proper, a complete union of the parietal bones, which obliterates the fontanelle, so universal among the suckers; the only other exception being seen in *Cycleptus*, Raf., as he has already observed. In all the members of the family that he has examined in this regard the fontanelle has been found quite open and of no doubtful proportions, and is nowhere reduced to the slit often seen in the Siluridæ, unless it be in the *Catostomus discobolus*. In searching for the characters of Girard's so-called genera *Minomus* and *Acomus*, he expressed the view that the type of the former, *M. insignis*, Baird & Girard, presents the character in question. This conclusion was based on a specimen sent to the Academy of Natural Sciences from Washington, bearing that name. Having since examined five specimens of the *M. insignis*, obtained by the geologists of this survey, he finds them to be true Catostomi as determined by the presence of the fontanelle. It therefore requires a name, and he proposes for it that of *Pantosteus*. It embraces *P. platyrhynchus*, *P. jarrovii* and *P. virescens* Cope of the present essay and *P. delphinus* and *P. bardus*, Cope, Hayden's Report, *l. c.*"—(YARROW, *Lieut. Wheeler's Expl. W. 100th Mer.* vol. 5, p. 673, 1876.)

PANTOSTEUS Cope & Jordan, 1877.—"Body oblong or elongate, with a short, subquadrate dorsal fin; air bladder in two parts; lateral line well developed; fontanelle obliterated by the union of the parietal bones."—(JORDAN, *Proc. Ac. Nat. Sc. Phila.* 1877, p. 81.)

ANALYSIS OF SPECIES OF PANTOSTEUS.

* Scales very small, 100 to 105 in the lateral line; 18 above and 16 below, in a cross-series: body elongate, compressed, the caudal peduncle contracted: head short, wide, 5 in length: muzzle obtuse, little projecting; upper lip wide; lower lip full, emarginate; jaws with well developed cartilaginous sheaths: scales much reduced in size forwards: dorsal rays 10; ventral 9: color olive; lower surface yellow ..... VIRESCENS, 38.

** Scales small, 80 to 85 in the course of the lateral line.

† Scales very much reduced and crowded anteriorly: upper lip full, pendent; cartilaginous sheaths on jaws well developed, the commissure transverse and abruptly angulate at the corners of the mouth.

a. Body extremely elongate, the depth 5½ to 7 in length: head 4½ in length, short and wide, with depressed and expanded muzzle, which considerably overhangs the mouth: isthmus very wide: dorsal rays 11; ventral rays 9: scales 15–86–12: belly and lower fins yellowish, probably red in life ..... PLATYRHYNCHUS, 39.

aa. Body moderately elongate, the depth 4½ to 5 in the length: head rather short, 4½ in length, not specially broadened; muzzle not greatly overhanging the mouth: dorsal rays 9 (rarely 10); ventral rays 10 (rarely 9): scales 11 to 14–83 to 87–13 to 15: light brown above, with dusky spots and clouds; males with the chin and fins red, and a crimson lateral band ..... GENEROSUS, 40.

†† Scales subequal over the body, not much reduced forwards: upper lip rather narrow, not pendent; cartilaginous sheath on jaws obsolete (?).

b. Body comparatively stout, the caudal peduncle short and thick, the back somewhat arched, the depth 4½ to 5 in length: head short and wide, flattish above, 4½ to 5 in length: scales 14–84–15: dorsal rays 9 to 11; ventral rays 10: blackish above, with one or two dark lateral shades ..... PLEBEIUS, 41.

38. PANTOSTEUS VIRESCENS *Cope.*

Green Sucker.

1876—*Pantosteus virescens* (COPE) COPE & YARROW, Wheeler's Expl. W. 100th Mer. v, Zool. 675.

Pantosteus virescens JORDAN & COPELAND, Check List, 156, 1876.

HABITAT.—Arkansas River in Colorado.

Only a single specimen of this species is known, collected by Mr. C. E. Aiken at Pueblo, Colo. The small size of its scales indicates its distinctness from the other species of *Pantosteus*. The greenness of coloration of the typical specimen is probably due to its having been kept in a copper tank.

Specimens in United States National Museum.

Number.	Locality.	Collector.
—	Arkansas River, Pueblo, Colo. (type)	C. E. Aiken.

39. PANTOSTEUS PLATYRHYNCHUS *Cope.*

Flat-headed Sucker.

1874—*Minomus platyrhynchus* COPE, Proc. Am. Philos Soc. Phila. 134.

Pantosteus platyrhynchus COPE & YARROW, Wheeler's Expl. W. 100th Mer. v, Zool. 673, pl. xxix, f. 3, 3 *a*, 1876.

Pantosteus platyrhynchus JORDAN & COPELAND, Check List, 156, 1876.

Pantosteus platyrhynchus JORDAN, Bull. U. S. Nat. Mus. xi, p. —, 1876.

HABITAT.—Utah Lake and tributaries.

The specimens which I have seen of this species are all small and in poor condition. Their remarkable slenderness is doubtless in part due to their flabbiness. The species as noted by Professor Cope much resembles *Catostomus discobolus.* It is also very similar to *Pantosteus generosus,* but at present I consider it distinct.

Specimens in United States National Museum.

Number.	Locality.	Collector.
12906	Utah Lake	Yarrow & Henshaw.
15163	Utah Lake	Yarrow & Henshaw.

40. PANTOSTEUS GENEROSUS (*Girard*) *Jordan.*

Yarrow's Sucker.

1856—*Catostomus* (*Acomus*) *generosus* GIRARD, Proc. Ac. Nat. Sc. Phila. 174.

Acomus generosus GIRARD, U. S. Pac. R. R. Expl. x, 221, 1858.

Catostomus generosus JORDAN & COPELAND, Check List, 156, 1876.

1874—*Minomus jarrovii* COPE, Proc. Am. Philos. Soc. Phila. 35.

Pantosteus jarrovii COPE & YARROW, Wheeler's Expl. W. 100th Mer. v, Zool. 674, pl. xxix, 2, 2 *a*, 1876.

Pantosteus yarrowi JORDAN & COPELAND, Check List, 156, 1876.

HABITAT.—Rio Grande, Colorado Basin, and Great Basin of Utah; very abundant.

This species is the most characteristic and most widely diffused of the Suckers of the Great Basin. It was first described by Girard in 1856, under the name of *Catostomus generosus.* Girard's description, unaccompanied by a figure, was so very loose and irrelevant that it has hitherto remained unidentified. I have, however, had the opportunity of examining Girard's original types, and of comparing them with the types of *Pantosteus jarrovii.* They seem to me to belong to the same species, and I am therefore compelled to substitute the name *generosus*

for that of *jarrovii*. If I had not been able to compare *generosus* with *jarrovii*, I should never have suspected their identity.

Specimens in United States National Museum.

Number.	Locality.	Collector.
256	Cottonwood Creek (types of *generosus*)	Lieut. Beckwith.
5910	Ojo de Gallo, N. Mex	Lieut. Beale.
15802	Zuñi River, New Mexico (types of *jarrovii*)	H. W. Henshaw.
17080	San Ildefonso, N. Mex	Yarrow & Cope.
17095	Mohave Desert, California	Dr. O. Loew.
18009	New Mexico	H. C. Yarrow.
20102	Pacific Railroad Survey, 38°	Lieut. Beckwith.

41. PANTOSTEUS PLEBEIUS (*Baird & Girard*) *Jordan.*

Plain Sucker.

1854—*Catostomus plebeius* BAIRD & GIRARD, Proc. Ac. Nat. Sc. Phila. 28.
Catostomus plebius AGASSIZ, Am. Journ. Sc. Arts, 2d series, xix, 208, 1855.
Minomus plebeius GIRARD, Proc. Ac. Nat. Sc. Phila. 173, 1856.
Minomus plebeius GIRARD, U. S. Mex. Bound. Surv. Ichth. 38, pl. xxii, f. 1–4, 1859.
Catostomus plebejus GÜNTHER, Cat. Fishes Brit. Mus. vii, 15, 1868.
Catostomus plebejus JORDAN & COPELAND, Check List, 156, 1876.
Pantosteus plebeius JORDAN, Bull. U. S. Nat. Mus. xi, p.—, 1878.

1872—*Minomus delphinus* COPE, Hayden's Geol. Surv. Wyoming, 1870, 435, 1872.
Pantosteus delphinus COPE & YARROW, Lieut. Wheeler's Rept. Expl. W. 100th Mer. vol. 5, 673, 1876.
Pantosteus dolphinus JORDAN & COPELAND, Check List, 156, 1876. (Misprint for *delphinus*.)

1872—*Minomus bardus* COPE, Hayden's Geol. Surv. Wyoming, 1870, 436.
Pantosteus bardus COPE, Lieut. Wheeler's Expl. W. 100th Mer. vol. 5, p. 673, 1876.
Pantosteus bardus JORDAN & COPELAND, Check List, 156, 1876.

HABITAT.—Basin of the Colorado. Lake Guzman.

The types of *Catostomus plebeius* are not to be found, and no specimens referable to the species are in the National Museum. The types of *Pantosteus delphinus* and *P. bardus* I have been unable to examine. The scale-formula and small dorsal fin of *C. plebeius* indicate that it is a species of *Pantosteus*. Assuming that it is so, I find myself unable to draw from the printed descriptions of *plebeius*, *delphinus*, and *bardus* any sort of specific characters. Until such characters are shown, the burden of proof lies with the proposer of those species, and I shall consider them as identical until they are proved to be distinct. In characters of mouth,

scales, and form of body, *Pantosteus plebeius* seems to resemble *Catostomus insignis* and *C. clarkii*, and to diverge from the type of *discobolus*, *generosus*, and *platyrhynchus*.*

* Professor Cope (*in lit.*) dissents from the identification above made, maintaining that *P. delphinus* and *P. bardus* are at least specifically distinct from each other, whatever may be the relation of either to *P. plebeius*. As I have seen none of the three forms in question, I let the above stand as I had written it, and quote the original descriptions of the three nominal species:—

MINOMUS PLEBEIUS Grd.—"Body sub-fusiform, compressed. Head elongate, subconical, forming the fifth of the entire length. Mouth of medium size. Eyes large, subelliptical, their longitudinal diameter being contained about five times in the length of side of head. Dorsal fin subquadrangular, its anterior margin being equidistant between the tip of the snout and the first rudimentary rays of the upper lobe of the caudal. The latter is slightly concave posteriorly, and the lobes rounded off. The base of the anal is contained nearly three times in its height, and when brought backwards its tip extends to the rudimentary rays at the inferior lobe of the caudal fin. The ventrals are inserted under the posterior third of the dorsal; bent backwards, their tip does not reach as far as the anus. The pectorals are of medium development, subovate, posteriorly acute.

"The scales are of medium size, considerably largest on the peduncle of the tail. Twenty-eight to thirty rows from the base of the ventrals to the dorsal fin. About eighty in the lateral line, which is not discernible as far back as the base of the caudal fin.

"The color as preserved in alcohol, is dark brown on the upper regions, faintly mottled with blackish patches. The sides and belly exhibit traces of orange in some of the specimens, in others it is pale yellowish. The fins are unicolor; the dorsal, caudal, and pectorals, blackish brown; the anals and ventrals yellowish."—(GIRARD, *Ich. U. S. and Mex. Boundary Surv.* ——, p. 38, figs. 1–4, plate xxii.)

MINOMUS DELPHINUS Cope.—"The subequal size of the scales of this species would refer it indifferently to the true group Catostomus of Girard, or his group Minomus, which he did not distinguish clearly. The preceding species would enter his Acomus, which is, however, only an undefined group of species, to which, by the way, the type of Catostomus, C. teres, belongs. This species is especially distinguished from those heretofore described by the shortening of the caudal part of the vertebral column, and the consequent posterior position of the dorsal fin. Add to this a short, wide head, and thick body, and its physiognomy is expressed.

"The dorsal outline is arched, the head flat above, but elevated behind, and much depressed on the muzzle. The muzzle is wide and does not project beyond the upper lip, which is appressed to its lower face and bears four rows of warts; its smooth commissural part is narrow. On the lower lip the tubercles advance nearly to the commissure; this lip is deeply emarginate posteriorly; the eye enters the length of the head five times, two and one-half times measuring the muzzle, and twice the interorbital region. Head four and two-thirds times in length to end of caudal basal scales. Scales in thirty longitudinal series, between dorsal and ventral fins; ventrals remark-

Genus CYCLEPTUS *Rafinesque.*

Cycleptus RAFINESQUE, Journal de Physique, de Chimie et d'Histoire Naturelle, Paris, 1819, p. 421.

Rhytidostomus HECKEL, Fische Syriens, Russegger's Reisen, 1842, p. 1023.

Catostomus et Sclerognathus sp. AUCT.

Type, *Cycleptus nigrescens* Rafinesque, = *Catostomus elongatus* Le Sueur.

Etymology, κύκλος, round; λεπτὸς, small. "The name means small, round mouth" (*Rafinesque*).

Head very small, short and slender, its length contained 6 to 7 times in that of the body, its upper surface rounded; eye quite small, nearly median, not very high up, its length 6 to 8 in that of the side of the head; suborbital bones rather small and quite narrow; fontanelle entirely obliterated by the union of the parietal bones.

Mouth small, entirely inferior, overlapped by the projecting snout, the upper lip thick, pendent, covered with 3 to 5 rows of tubercles, the outer quite large, the inner small; lower lip moderate, formed some-

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ably short, extending little more than half way to vent, originating under posterior third of dorsal. Pectorals well separated. Isthmus wide.

"Color above blackish, with a strong inferior marginal shade on the lower part of the sides, and the lighter tint above; a brown spot just above axilla, is cut off from it by a band of the yellow color which covers the belly and head below.

"The only species concerning which any doubt can arise in the nomenclature of this one is *C. bernardini* of Girard. That writer states that the latter possesses 15 D. radii; this, with the ascription of a slender form and other peculiarities, will always separate them. Three species in Professor Hayden's collection without locality. This should be probably a tributary of Green River."—(COPE, *Hayden's Geol. Surv. Terr.* 1872, p. 436.)

MINOMUS BARDUS Cope.—"This species is distinguished by its very short head, and marked coloration, resembling in that respect the *C. guzmaniensis* of Girard; with this species, it has, however, nothing else in common.

"Head wide, muzzle not projecting beyond upper lip; latter not pendent, with narrow, smooth commissure and three or four rows of tubercles. Lower lip deeply incised, tubercular to near inner edge. Eye 5.25 times in length of head, twice in interorbital width. Head five times to end of basal caudal scales. Form stout: body cylindric anteriorly. Dorsal fin nearer end of muzzle than end of caudal scales. Scales of body subequal, in thirty longitudinal rows between dorsal and ventral fins, latter originating beneath hinder border of dorsal, not quite reaching vent. Pectorals well separate; isthmus wide, narrower than in *M. delphinus*. Color blackish above, a broad olive band from upper part of opercular border along upper half of caudal peduncle, and a broad black band below, narrowing to a line along the middle of the peduncle; below, yellowish, a band of the same cutting off a blackish area above the axilla, as in the last species."—(COPE, *Hayden's Geol. Surv. Terr.* 1872, p. 436.)

what as in *Catostomus*, but less full, incised behind; jaws without cartilaginous sheath; muciferous system not greatly developed; opercular apparatus not greatly developed, the operculum smooth and narrow. Isthmus moderate; gill-rakers moderately long, soft; pharyngeal bones strong, the teeth stout, increasing in size downwards, rather wide apart.

Body elongate, moderately compressed, not much elevated, the caudal peduncle long, the greatest depth contained 4 to 6 times in length.

Scales moderate, about equal over the body, not closely imbricated, with wide exposed surfaces, the number in the lateral line from 55 to 60, and about 17 in a transverse series from dorsal to ventrals; edges of scales serrate; lateral line well developed, nearly straight.

Fins rather large; dorsal fin beginning in front of ventrals and ending just before anal, of about 30 rays, strongly falcate in front, the first and second developed rays in length more than half the length of the base of the fin, the rays rapidly shortened to about the eighth, the length of the remaining rays being nearly uniform and all short; caudal fin large, widely forked, the lobes about equal; anal fin quite small, low, of 7 or 8 developed rays, scaly at base; ventrals moderate, with 10 rays; pectorals elongate, somewhat falcate.

Sexual peculiarities somewhat marked; the males in spring with black pigment; the head then covered with small tubercles.

Air-bladder with two chambers, the anterior short, the posterior elongate.

But a single species of this singular genus is as yet known. It is found in the waters of the Mississippi Valley, and, although not a rare fish, it is by no means as generally abundant as are many others of its family.

Generic Characterizations.

CYCLEPTUS Rafinesque, 1819.—"Cycleptus, (abdominal). Différent du genre Catostomus. Deux nageoires dorsales, bouche petite, ronde, au bout du museau; lèvres circulaires. Famille Cyprinidia? *C. nigrescens*, noirâtre; ventre blanchâtre, bouche retroussée; queue fourchée. Parvient à deux pieds de long; très bon à manger, rare dans l'Ohio et le Missouri."—(RAFINESQUE, *Journ. de Phys. etc.* 1819, p. 421.)

CYCLEPTUS Rafinesque, 1820.—"Difference from the foregoing genus [*Catostomus*]—two dorsal fins, mouth round and terminal."—(RAFINESQUE, *Ich. Oh.* p. 6.)

RHYTIDOSTOMUS Heckel, 1842.—"Dentes pectiniformes 60–60. Pinna dorsalis basi elongata; radio tertio vel quarto longissimo. In reliquis cum genere Catostomo congruit."—(HECKEL, *Fische Syriens*, p. 33, or *Russeger's Reisen*, p. 1023.—Species referred to the genus, *Cyprinus catostomus* Forster and *Catostomus elongatus* Le Sueur.)

CYCLEPTUS Agassiz, 1855.—"As in many other instances, Rafinesque has named, but neither defined nor characterised the genus to which I now call attention. He has not

himself even seen the fish upon which the genus is founded, and refers to another genus a species which cannot be separated from this. Moreover, the characteristics of the genus, as given by Rafinesque, are not true to nature. Yet, notwithstanding these objections, I do not feel at liberty to reject his generic name, since it is possible to identify the fish he meant by the vernacular name under which it is known in the West. There is another reason why Rafinesque's description of our western fishes ought to be carefully considered and every possible effort made to identify his genera and species, the fact that he was the first to investigate the fishes of the Ohio and its tributaries upon a large scale, and that notwithstanding the looseness with which he performed the task and the lamentable inaccuracies of his too short descriptions, his works bear almost upon every page the imprint of his keen perception of the natural affinities of species, and their intimate relations to one another; so much so, that even where he has failed to assign his genera any characters by which they may be recognized, yet, when the species upon which they were founded can be identified, we usually find that there are good reasons for considering them as forming distinct genera.

"The trouble with Rafinesque is, that he tóo often introduced in his works species which he had not always seen himself, and which he referred almost at random among his genera, thus defacing his well characterised groups, or that he went so far as to found genera upon species which he had never seen, overlooking perhaps that he had already described such types under other names.

"The genus *Cycleptus* affords a striking example of all these mistakes combined together. In his remarkable paper upon the genus *Catostomus*, Lesueur describes and figures one species from the Ohio River, under the name of *C. elongatus*, peculiar for its elongated cylindrical body, and for its long dorsal fin beginning half way between the pectorals and ventrals, and extending as far back as the insertion of the anal. The species Rafinesque introduces in his subgenus *Decactylus* among the genuine *Catostomi*, without perceiving that it belongs to his own genus *Cyclɾptus*. This mistake arises undoubtedly from his belief that in *Cycleptus* there are two dorsals, which indeed he mentions as characteristics of this genus; but this statement is erroneous: the rays of the dorsal are, in fact, enclosed in a continuous membrane, the anterior rays only being much longer than those of the middle and posterior portion of the fin; occasionally these long rays split, and accidentally separate from the following ones, when they seem to form two dorsals.

"The character of this genus, so far as the dorsal is concerned, consists in reality not in its division, but in its great extension along the back, and the elongation of its anterior rays. The anal is very long in proportion to the size of the fish, and inserted far back, so that the length of the abdominal cavity is greater than in the genera *Carpiodes*, *Ichthyobus*, and *Bubalichthys*, with which *Cycleptus* is closely allied by the peculiar form of its dorsal. Again, Rafinesque remarks that the mouth is terminal, round and small. This requires also to be qualified. The mouth appears terminal and round only when the jaws are protruded to their utmost extent; when closed, it is rather crescent-shaped and entirely retracted under the projecting, pointed snout; the lips are covered with numerous projecting papillæ and spread horizontally,—these are moreover, continuous around the angles of the mouth, so that the upper and lower l ps are hardly separated by a small fold, and the lower lip is slightly emarginate in the middle, while in other genera of this tribe it is actually bilobed.

"The pharyngeal bones are strong, their anterior surface being flattened and the greatest diameter being the transverse one, as in *Bubalichthys*, and not laterally compressed and thin as in *Carpiodes* and *Ichthyobus*.

"The symphysis is short and its peduncle flat and square, separated from the curved arch by a deep semicircular emargination. The teeth are also stronger and stouter than in *Carpiodes* and *Ichthyobus*, as is also the case in *Bubalichthys*, and they are gradually increasing in size, and relative thickness from the upper part of the arch to the symphysis, but they are much fewer and farther apart than in the latter genus. Their inner edge is transverse, rather blunt, though the middle ridge is somewhat projecting; the lower teeth are so shaped that their inner angle is hardly higher than the outer, while in the middle and upper teeth it is gradually more projecting, and from the middle of the arch upwards forms a prominent point arched outwards.

"The scales are considerably longer than high, with a rather prominent posterior margin; numerous radiating furrows upon the anterior and posterior fields, some across the lateral fields; the concentric ridges of the posterior field are not only broader than those of the other fields, but instead of running parallel to the margin of the scales they are curved in concentric gothic arches between each two radiating furrows. Heckel mentions this genus under the name of *Rhytidostomus*, but Rafinesque's name *Cycleptus* has the priority. Properly it ought to be called *Leptocyclus*, according to its etymology, (see my Nomenclator Zoologicus; Index Universalis, p. 109,) but under this form nobody would recognise it as Rafinesque's name. I shall therefore not urge the change."—(AGASSIZ, *Am. Journ. Sci. Arts*, 1855, p. 197.)

CYCLEPTUS Cope & Jordan, 1877.—"Body much elongated, subcylindrical forwards: dorsal elongate, falciform, of 30 or more rays; fontanelle obliterated by the union of the parietal bones; mouth small, inferior, with papillose lips."—(JORDAN, *Proc. Ac. Nat. Sc. Phila.* 1877, p. 81.)

ANALYSIS OF SPECIES OF CYCLEPTUS.

* Depth 4 to 5 in length: head 6 to 6½: eye small, 6 to 7 in length of head: longest dorsal rays a little longer than head: pectorals rather longer than head: dorsal rays 30; anal 7 or 8: scales 9–56–7: coloration very dark, the males almost black; size large; length of adult 1½ to 2½ feet ..... ELONGATUS, 42.

42. CYCLEPTUS ELONGATUS (*Le Sueur*) *Agassiz.*

Black Horse. Gourd-seed Sucker. Missouri Sucker. Suckerel.

1817—*Catostomus elongatus* LE SUEUR, Journ. Ac. Nat. Sc. Phila. 103.

Catostomus elongatus RAFINESQUE, Ich. Oh. 60, 1820.

Catostomus elongatus KIRTLAND, Rept. Zool. Ohio, 168, 1838.

Catostomus elongatus DEKAY, New York Fauna, part iv, Fishes, 203, 1842.

Catostomus elongatus CUVIER & VALENCIENNES, Hist. Nat. des Poiss. xvii, 455, 1844.

Catostomus elongatus KIRTLAND, Boston Journ. Nat. Hist. v, 267, 1845.

Catostomus elongatus STORER, Synopsis, 422, 1846.

Cycleptus elongatus AGASSIZ, Am. Journ. Sc. Arts, 2d series, xix, 197, 1855.

Sclerognathus elongatus GÜNTHER, Cat. Fishes Brit. Mus. vii, 23, 1868.

Cycleptus elongatus JORDAN, Fishes of Ind. 222, 1875.
Cycleptus elongatus JORDAN, Bull. Buffalo Soc. Nat. Hist. 95, 1876. (Name only.)
Cycleptus elongatus JORDAN, Man. Vert. 298, 1876.
Cycleptus elongatus NELSON, Bull. No. 1, Ills. Mus. Nat. Hist. 50, 1876.
Cycleptus elongatus JORDAN & COPELAND, Check List, 158, 1876. (Name only.)
Cycleptus elongatus JORDAN & GILBERT, in Klippart's Rept. 53, 1876. (Name only.)
Cycleptus elongatus JORDAN, Bull. U. S. Nat. Mus. ix, 38, 1877.
Cycleptus elongatus JORDAN, Man. Vert. ed. 2d, 1878.
1818—*Cycleptus nigrescens* RAFINESQUE, Journal de Physique, 421.
Cycleptus nigrescens RAFINESQUE, Ich. Oh. 61, 1820.

HABITAT.—Mississippi Valley, in all the larger streams.

This species is found in some abundance in the larger streams. At the Falls of the Ohio, it is taken in nets, and meets a ready sale. It is, however, much less abundant than the Buffalo fishes are. From the general use of the name "Missouri Sucker", its abundance in the State of Missouri may be inferred; but, as to the facts in the case, I am not informed. This fish is as sharply distinguished from the other Suckers in its appearance as in its anatomy. The dusky colors and the small size of the head attract attention at once.

But one species is yet known. That being the case, the synonymy of the species needs no discussion, its oldest name being the one in common use.

Specimens in United States National Museum.

Number.	Locality.	Collector.
107	.....	
8673	.....	
10790	Cincinnati, Ohio	J. W. Milner.
12278	.....do	Do.

Genus CARPIODES *Rafinesque.*

Carpiodes RAFINESQUE, Ich. Oh. 56, 1820. (As subgenus of *Catostomus.*)
Sclerognathus VALENCIENNES, Hist. Nat. des Poissons, xvii, 472, 1844.
Type, *Catostomus cyprinus* Le Sueur.
Etymology, Latin *carpio*, a carp; *i. e.*, carp-like.

Head comparatively short and deep, sometimes conic, sometimes blunt, its length ranging from $3\frac{1}{2}$ to 5 in that of the body, its upper surface always rounded; eye moderate, median or anterior in position; suborbital bones well developed, their depth more than half that of

the fleshy portion of the cheek below; fontanelle always present, well developed.

Mouth always small, horizontal and inferior, the mandible less than one-third the length of the head, the lips thin, the upper protractile, narrow, the lower quite narrow, Λ-shaped, or rather ∩-shaped, behind; both lips feebly plicate or nearly smooth, the plicæ often more or less broken up; jaws without cartilaginous sheath; muciferous system moderately developed; opercular apparatus well developed, the subopercle broad, the operculum in the adult more or less rugose; isthmus moderate; pharyngeal bones remarkably thin and laterally compressed, with a shallow furrow along the anterior margin on the inside, and another more central one on the outline of the enlarged surfaces; teeth very small, compressed, nearly equally thin along the whole inner edge of the bone, forming a fine comb-like crest of minute serratures; their cutting edge rises above the inner margin into a prominent point. Gillrakers of anterior arch slender and stiff above, becoming reduced downwards.

Body ovate or oblong, the dorsal outline more or less arched, the ventral outline more nearly straight, the depth from half to one-third the length, the sides compressed; the back notably so, forming a sort of carina; caudal peduncle short and deep; scales large, about equal over the body, their posterior margins slightly serrate; lateral line well developed, nearly straight, with 34 to 41 scales, 12 to 15 scales in a cross-row from dorsal to ventrals; dorsal fin beginning near the middle of the body, somewhat in advance of ventrals, falcate, its anterior rays very much elevated and usually filamentous, their height ranging from ½ to 1¼ the length of the base of the fin, the number of developed rays ranging from 23 to 30; caudal fin well forked, the lobes equal; anal fin comparatively long and low, emarginate (in males?), its number of developed rays usually 8; ventrals shortish, with usually 10 rays; pectorals short.

Sexual peculiarities little marked; in some species, at least, the males in spring have the snout minutely tuberculate.

Coloration always plain; pale olivaceous above, white below, but hardly silvery, the fins all partaking of the color of the region to which they belong.

Air-bladder with two chambers.

Size medium or rather large.

This genus was first recognized and defined by Professor Agassiz in

1855. Since then it has been generally received by authors under the same name and with the same limits. It was first briefly outlined by Rafinesque in 1820 under the name of *Carpiodes*, then afterwards by Valenciennes defined more fully under the name of *Sclerognathus*. Both *Carpiodes* and *Sclerognathus* having the same typical species (*Catostomus cyprinus* Le Sueur), the older and preferable name, *Carpiodes*, is the one to be adopted.

The recognition of species in this genus is a matter of extreme difficulty, from their great resemblance to each other in color, size, form, and general appearance. Our knowledge of the species thus far has been almost entirely due to the labors of Professor Cope ("A Partial Synopsis of the Fishes of North Carolina", Proc. Am. Philos. Soc. Phila. 1870). I have myself examined specimens agreeing with each of Professor Cope's descriptions, and, with two exception (*Carpiodes selene* and *Carpiodes grayi*), I am disposed to admit all his species. It is true, however, that in every large collection of *Carpiodes* there are specimens disagreeing more or less from the typical forms of each species, and which should, in consistency, be described as distinct species, or else the species which they appear to connect should be united. I have not, however, examined a sufficiently full series of *Carpiodes* to be prepared to accept either of these alternatives. I have, therefore, taken Professor Cope's analysis of the species, and added to it such additional features as I have been able to observe, and I give the whole as our best knowledge at present on the subject, leaving for future study the consideration of the degree of relationship existing between *cyprinus*, *velifer*, and *thompsoni*. The other four species, *carpio*, *bison*, *cutisanserinus*, and *difformis*, seem to be manifestly distinct, unless *difformis* be a monstrous form of *cutisanserinus*.

Species of this genus are found in all the fresh waters of the United States east of the Rocky Mountains. They seldom ascend the small streams, and are taken by means of nets from the larger rivers and lakes. From their resemblance in form to the European Carp (*Cyprinus carpio*), they are popularly known as "Carp". This resemblance has suggested the name of the genus and of two of its species. As food-fishes they are rather indifferent, the flesh being rather coarse and flavorless and full of small bones. The geographical distribution of the species has been little studied. *C. cyprinus* is the common species east of the Alleghanies, and, if "*C. damalis*" and "*C. tumidus*" be the same, in the Upper Missouri region and the Rio Grande also. *C. thompsoni* is the

common Carp of the Great Lakes. *C. carpio* is the most abundant species in the Ohio River, where *C. velifer* and *C. cutisanserinus* also occur in immense numbers.

I am convinced that neither the number of scales nor the number of fin-rays can be relied on to distinguish species in this genus, the entire range of variation being probably found in every species. The height of the anterior rays of the dorsal, although subject to considerable variation with age and wear, seems to be sufficiently constant to divide the species into two groups.

Generic Characterizations.

CARPIODES Rafinesque, 1820.—"Body oblong, somewhat compressed; head compressed, nine abdominal rays, dorsal fin commonly elongate, tail equally forked."—(RAFINESQUE, *Ich. Oh.* p. 56.)

SCLEROGNATHUS Storer, 1846.—"Snout slightly advanced beyound the mouth; the extremity of the mouth is supported, as in the *Catostomi*, by the intermaxillary, which is furnished in front with a well developed, projecting, cartilaginous ethmoid. The upright branch is long, and of a styloid form, while the horizontal is shortened, and is a mere keel, the inferior edge of which serves merely to support the superior angle of the mouth. The remainder of the maxillary arch is formed by a fibrous ligament covered by a thin, undilated lip, reduced to a thin and fleshy protuberance. The upper jaw is a wide, very solid bony piece, under which the upper lip is partly drawn; this bone is concealed by the first two suborbitals, being wider and no less advanced than those of the *Catostomi*. As to its lips, it is a *Leuciscus;* but the osteology of its mouth resembles that of the *Catostomi*. The dorsal is long, like that of the Carps. The head is naked, marked by lines of mucous pores. Pharyngeal teeth comb-like, finer and more equal than those of the *Catostomi*. The air-bladder is divided into two large lobes; the anterior is large and rounded, with a slight depression at its superior face: the second conical, twice as long as the first and followed by two small lobes; the second communicates with the œsophagus by an air-pipe."—(STORER, *Mem. Am. Ac. Arts and Sc.* 1846, p. 427; essentially a translation from Valenciennes's account.)

CARPIODES Agassiz, 1855.—"The body is very high and strongly compressed, the narrow ridge on the back forming the outline in front of the dorsal is very much arched, and regularly continuous downwards with the rather steep profile of the head.

"The head is short, its height and length differ but little. The snout is short and blunt. The small mouth is entirely inferior, and surrounded by narrow thin lips, which are more or less transversely folded. The lower jaw is short and broad. The pharyngeal bones of *Carpiodes* are remarkably thin, compressed laterally, with a shallow furrow along the anterior margin on the side, and another more central one on the outline of the arched surfaces; the teeth are very small, compressed, equally thin along the whole inner edge of the bone, forming a fine comb-like crest of minute serratures; their cutting edge rises above the inner margin into a prominent point.

"The anterior lobe of the long dorsal is slender, its third and fourth rays being prolonged beyond the following ones into long filaments. The lower fins are all pointed,

rather small, and hence different from one another. The ventral ridge of the body is flat. The scales have many narrow, radiating furrows upon the anterior field, and are more deeply marked, in a straight line, across the lateral fields, or limiting the lateral and posterior fields, hardly any upon the anterior field, the waving of the broader concentric ridges producing only a radiated appearance upon that field. Tube of the lateral line straight and simple, arising in advance of the centre of radiation, which is seated in the centre of form of the scales."—(AGASSIZ, *Am. Journ. Sc. Arts*, 1855, p. 189.)

CARPIODES Günther, 1868.—"Distinguished from *Sclerognathus* (*i. e. Bubalichthys* and *Ichthyobus*) by its very thin, compressed pharyngeal bones, which are armed with a comb-like series of nearly equally minute compressed teeth."—(GÜNTHER, *Cat. Fishes' Brit. Mus.* vii, p. 24.)

CARPIODES Cope & Jordan, 1877.—"Body oblong oval, compressed; dorsal elongate, elevated in front, of 20 or more rays; fontanelle present; pharyngeal bones narrow, with the teeth relatively thin and weak; mouth small, inferior, protractile downwards."—(JORDAN, *Proc. Ac. Nat. Sc. Phila.* 1877, p. 82.)

ANALYSIS OF SPECIES OF CARPIODES.

* Dorsal fin with the anterior rays very much elevated and attenuated, equalling or more usually exceeding the length of the base of the fin.

† Muzzle very abruptly obtuse, almost vertically truncate in front.

a. Muzzle exceedingly blunt, so that the anterior edge of the mandible is in line with the anterior rim of the orbit, and the maxillary reaches to the anterior edge of the pupil: anterior suborbital deeper than long: head 4¼ in length: eye quite large, 3½ to 4 in head: body arched, the depth somewhat less than half the length: first ray of dorsal nearer muzzle than base of caudal: scales 6–35–4: D. 24, A. 8, V. 9.....DIFFORMIS, 43.

aa. Muzzle notably blunt, but less so than in the preceding: anterior edge of the mandible in advance of the orbit, and the maxillary just reaching the line of the lower rim of the orbit: anterior suborbital bone deeper than long (longer than deep, "*selene*"): head 4 times in length: eye smallish, 4½ in head: body arched, the depth about 2¼ in length: anterior rays of dorsal about midway between snout and base of caudal: scales 7–37–5: D. 26, A. 8, V. 10.....CUTISANSERINUS, 44.

†† Muzzle conic, projecting, obtusely pointed: end of the mandible reaching to opposite nostrils: anterior suborbital as deep as long: head 3¾ in length: eye moderate, 4 to 4½ in length of head: body arched above, the depth 2¼ to 2½ in length: first ray of dorsal nearer muzzle than base of caudal: scales 7–37–5: D. 26 or 27 ("22", *Cope*).....VELIFER, 45.

** Dorsal fin with the anterior rays more or less shortened, their length one-half to two-thirds that of the base of the fin: muzzle more or less conic and projecting.

b. Head long, contained about 3¼ times in length to base of caudal: muzzle elongate-conic, so that the eye is nearly median, the middle of the length of the head falling in front of its posterior margin: body not much arched; depth 3 in length: anterior rays of dorsal pretty high, not much shorter than the base of the fin, not thickened at base: lips well developed: eye large, 4½ in head: scales 7–40–5: D. 27, A. 7, V. 10.....BISON, 46.

bb. Head intermediate, its length contained about 4 times (3¾ to 4¼) in that of body: anterior rays of dorsal not thickened at base.

c. Body stout, short, the back much arched, the depth 2¼ in length: head 4 to 4¼ in length, the muzzle moderately pointed: dorsal rays considerably elevated, two-thirds as long as base of fin: eye small, 5½ in head: tip of lower jaw much in advance of nostrils; maxillary reaching line of orbit: anterior suborbital large, deep, roundish: origin of dorsal about midway of body: scales rather closely imbricated, 8–39 to 41–6: D. 27, A. 7, V. 10.

THOMPSONI, 47.

cc. Body elongate, not much elevated, the depth 2¾ in length: head 3¾ to 4, the muzzle prominent but rather bluntish: front scarcely concave above eyes, the profile forming a somewhat uniform curve: eye small, nearly 6 in head: anterior rays of dorsal moderately elevated, nearly three-fourths the length of the fin, the first ray nearly midway between snout and base of caudal: scales 6–37–5: D. 24 to 27, A. 8, V. 10 ..... CYPRINUS, 48.

bbb. Head comparatively short, its length contained 4¼ to 5 times in the length of the body: body more fusiform than in the others, compressed, but not much arched, the depth 2¾ to 3 times in the length: anterior rays of dorsal short, notably thickened and osseous at base, the first ray nearer the end of the muzzle than the base of the caudal fin: eye small, anterior, 4¼ in head: muzzle short, but projecting much beyond mouth: size largest of the genus.

CARPIO, 49.

43. CARPIODES DIFFORMIS *Cope.*

Deformed Carp Sucker.

1870—*Carpiodes difformis* COPE, Proc. Am. Philos. Soc. Phila. 480.
Carpiodes difformis JORDAN, Man. Vert. 297, 1876.
Carpiodes difformis JORDAN & COPELAND, Check List, 158, 1876.
Carpiodes difformis JORDAN, Proc. Ac. Nat. Sc. Phila. 72, 1877.
Carpiodes difformis JORDAN & GILBERT, in Klippart's First Report Ohio Fish Commission, 86, pl. xiii, f. 21, 1877.
Carpiodes difformis JORDAN, Bull. U. S. Nat. Mus. 9, 50, 1877.
Carpiodes difformis JORDAN, Man. Vert. ed. 2d, 321, 1878.

HABITAT.—Ohio Valley; less common than the other species.

The only specimen which I have seen of this species was from the Wabash River, in which stream Professor Cope's original types were collected. No specimens are in the United States National Museum, which, indeed, at present contains very few of the Carp Suckers or Buffalo-fish.

44. CARPIODES CUTISANSERINUS *Cope.*

Long-finned Carp Sucker. Quillback.

1870—*Carpiodes cutisanserinus* COPE, Proc. Am. Philos. Soc. Phila. 481.
Carpiodes cutisanserinus JORDAN & COPELAND, Check List, 158, 1876.

Carpiodes cutisanserinus JORDAN, Bull. U. S. Nat. Mus. 9, 50, 1877.
Carpiodes cutisanserinus JORDAN & GILBERT, in Klippart's Rept. 53, 1876.
Carpiodes cutisanserinus JORDAN, Man. Vert. ed. 2d, 321, 1878.
1870—*Carpiodes selene* COPE, Proc. Am. Philos. Soc. Phila. 481.
Carpiodes selene JORDAN & COPELAND, Check List, 158, 1876.
Carpiodes selene JORDAN & GILBERT, in Klippart's Rept. 53, 1876.
Carpiodes selene JORDAN, Man. Vert. ed. 2d, 321, 1878.
1876—*Ichthyobus difformis* NELSON, Bull. No. 1, U. S. Nat. Mus. 49.

HABITAT.—Mississippi Valley; generally abundant.

This species is closely related to *C. velifer*, but differs in the abruptly truncate snout, that of *velifer* being conic. I am unable to recognize *C. selene* as a distinct species at present, the form of the anterior suborbital being the only distinguishing feature of much importance, and that probably not a constant one. *C. cutisanserinus* is as abundant in the Ohio as *C. velifer*, and I have seen many specimens from the Illinois River.

Specimens in United States National Museum.

Number.	Locality.	Collector.
20032	Cumberland River	A. Winchell.
20033	....do	Do.

45. CARPIODES VELIFER (*Rafinesque*) *Agassiz.*

Carp Sucker. Skimback. Quillback. Sailor. Sailing Sucker. Spear-fish.

1820—*?? Catostomus antiopterus* RAFINESQUE, Ich. Oh. 45. (Description at second h and unrecognizable.)
1820—*Catostomus velifer* RAFINESQUE, Ich. Oh. 56.
Catostomus velifer KIRTLAND, Rep. Zool. Ohio, 168, 1838.
Carpiodes velifer AGASSIZ, Am. Journ. Sc. Arts, 2d series, xix, 191, 1855.
Carpiodes velifer COPE, Proc. Am. Philos. Soc. Phila. 482, 1870.
Carpiodes velifer JORDAN, Fishes of Ind. 222, 1875.
Carpiodes velifer JORDAN, Bull. Buffalo Soc. Nat. Hist. 95, 1876.
Carpiodes velifer JORDAN, Man. Vert. 297, 1876.
Carpiodes velifer JORDAN & Copeland, Check List, 158, 1876.
Ichthyobus velifer NELSON, Bull. No. 1, Ills. Mus. Nat. Hist. 49, 1876.
Carpiodes velifer JORDAN & GILBERT, in Klippart's First Report O Commission, 87, 1877.
Carpiodes velifer JORDAN, Bull. U. S. Nat. Mus. ix, 34, 1877.
Carpiodes velifer JORDAN, Man. Vert. ed. 2d, 321, 1878.

1846—*Sclerognathus cyprinus* KIRTLAND, Bost. Journ. Nat. Hist. vol. v, 275. (In part; not of C. & V.)

HABITAT.—Western streams and lakes (Cayuga Lake, New York, to Mississippi River).

This species is quite abundant in the Ohio River, and I have seen specimens not evidently distinguishable, from Lake Erie and from other waters tributary to the Great Lakes. Indiscriminately with *C. cutis-anserinus*, it is known to the fishermen as Quillback, Skimback, etc., the lower-finned species being called rather "Carp". Most of the synonymy above quoted includes several species, the true *velifer* being first distinguished by Professor Cope. Rafinesque's *anisopterus* I bring into the synonymy of this species, simply to refer to it somewhere. It is really unidentifiable. Kirtland's *Sclerognathus cyprinus* refers most to this species, but his figure represents no known fish. The head is too small, and the form, etc., incorrect.

Specimens in United States National Museum.

Number.	Locality.	Collector.
20277	Cayuga Lake, New York.....	

There are also several other specimens in the collection, but without locality.

46. CARPIODES BISON *Agassiz.*

Long-headed Carp Sucker.

1854—*Carpiodes bison* AGASSIZ, Am. Journ. Sci. Arts, 356.
Carpiodes bison AGASSIZ, Am. Journ. Sci. Arts, 190, 1855.
Carpiodes bison COPE, Proc. Am. Philos Soc. Phila. 483, 1870.
Carpiodes bison JORDAN, Man. Vert. 297, 1876.
Carpiodes bison JORDAN & COPELAND, Check List, 158, 1876.
Ichthyobus bison NELSON, Bull. No. 1, Ills. Mus. Nat. Hist. 49, 1876.
Carpiodes bison JORDAN & GILBERT, in Klippart's Rept. 53, 1876.
Carpiodes bison JORDAN, Bull. U. S. Nat. Mus. ix, 50, 1877.
Carpiodes bison JORDAN, Man. Vert. ed. 2d, 322, 1878.

HABITAT.—Mississippi Valley (Osage River, *Agassiz;* Mississippi River, Wabash River, Tennessee River, *Cope*).

What the fish is to which Professor Agassiz gave the name "*bison*" cannot be ascertained from the published descriptions. Professor Cope has described the present species under that name, and we accept the

name *bison* on his authority. This species is not generally common in so far as my experience goes. I have, however, seen one or two from the Ohio River. I found no specimens in the National Museum.

47. CARPIODES THOMPSONI *Agassiz.*

Lake Carp.

1842—*Catostomus cyprinus* THOMPSON, Hist. Vt. 133.

1855—*Carpiodes thompsoni* AGASSIZ, Am. Journ. Sc. Arts, 2d series, xix, 191.

Carpiodes thompsoni COPE, Proc. Ac. Nat. Sc. Phila. 285, 1864.

Carpiodes thompsonii COPE, Proc. Am. Philos. Soc. Phila. 483, 1870.

Carpiodes thompsoni JORDAN, Man. Vert. 297, 1876.

Ichthyobus thompsoni NELSON, Bull. No. 1, Ills. Mus. Nat. Hist. 49, 1876.

Carpiodes thompsoni JORDAN & COPELAND, Check List, 158, 1876.

Carpiodes thompsonii JORDAN & GILBERT, in Klippart's Rept. 53, 1876.

Carpiodes thompsoni JORDAN, Man. Vert. ed. 2d, 322, 1878.

HABITAT.—Great Lake region; abundant.

This species occurs in more or less abundance throughout the Great Lake region. It is the shortest and most arched of all the species. Its dorsal fin is about intermediate between that of *velifer* and that of *carpio*. I have examined very many specimens of this species, and I find little variation among them. This fish reaches a length of something over a foot, and is sold by the Lake fishermen as "Carp".

Specimens in United States National Museum.

Number.	Locality.	Collector.
11040	Sandusky, Ohio	J. W. Milner.
11127	....do	Do.
11128	....do	Do.
11130	....do	Do.
11131	....do	Do.
11132	....do	Do.

48. CARPIODES CYPRINUS (*Le Sueur*) *Agassiz.*

Eastern Carp Sucker. Nebraska Carp Sucker. Rio Grande Carp.

1817—*Catostomus cyprinus* LE SUEUR, Journ. Ac. Nat. Sc. Phila. I, 91.

Labeo cyprinus DEKAY, New York Fauna, part iv, Fishes, 194, 1842.

Sclerognathus cyprinus CUVIER & VALENCIENNES, Hist. Nat. des Poissons, xvii, 474, 1844.

Sclerognathus cyprinus STORER, Synopsis, 427, 1846.

Carpiodes cyprinus AGASSIZ, Am. Journ. Sc. Arts, 2d series, xix, 191, 1855.

Carpiodes cyprinus GÜNTHER, Cat. Fishes Brit. Mus. vii, 24, 1868.

Carpiodes cyprinus COPE, Proc. Am. Philos. Soc. Phila. 484, 1870.

Carpiodes cyprinus JORDAN, Fishes of Ind. 202, 1875.

Carpiodes cyprinus JORDAN, Man. Vert. 297, 1876.

Carpiodes cyprinus UHLER & LUGGER, Fishes of Maryland, 140, 1876.

Carpiodes cyprinus JORDAN & COPELAND, Check List, 158, 1876.

Carpiodes cyprinus JORDAN, Man. Vert. ed. 2d, 323, 1878.

1854—*Carpiodes vacca* AGASSIZ, Am. Journ. Sci. Arts, 356.

1854—*Carpiodes tumidus* BAIRD & GIRARD, Proc. Phila. Ac. Nat. Sc. 28.

Ictiobus tumidus GIRARD, U. S. Mex. Bound. Surv. Ich. 34, pl. xxx, f. 1–4, 1859.

Ichthyobus tumidus JORDAN & COPELAND, Check List, 158, 1876.

1856—*Carpiodes damalis* GIRARD, Proc. Ac. Nat. Sc. Phila. 170.

Carpiodes damalis GIRARD, U. S. Pac. R. R. Expl. x, 218, pl. xlviii, f. 1–4, 1858.

Carpiodes damalis COPE, Proc. Ac. Nat. Sc. Phila. 85, 1865.

Carpiodes damalis JORDAN & COPELAND, Check List, 155, 1876.

1870—*Carpiodes grayi* COPE, Proc. Am. Philos. Soc. Phila. 482, 1870.

Carpiodes grayi JORDAN & COPELAND, Check List, 158, 1876.

Carpiodes grayi COPE & YARROW, Wheeler's Expl. W. 100th Mer. v, Zool. 681, 1876.

HABITAT.—New England to Alabama; thence to Mexico and north to the Upper Missouri.

I have elsewhere already united the nominal species *grayi* and *tumidus*, for the following reasons:—Girard's "*Ictiobus tumidus*" is certainly a *Carpiodes*, as is plainly shown by the published figure, the mouth being represented as small and inferior, beneath the projecting snout. I have numerous young specimens of a *Carpiodes* from the Rio Grande, at Brownsville, Texas, the original locality of *Ictiobus tumidus*. But my specimens do not disagree in any important respect from *Carpiodes grayi*, from the same river, nor am I able, on examination of authentic specimens of the latter species, to point out any differences between them and my Brownsville specimens. Therefore, if *tumidus* and *grayi* are really different, the differences have escaped my notice. It is of course possible that my Brownsville specimens, although from the original locality of *tumidus*, may not be that species; but, as the types of *tumidus* have been lost, I do not see how the question can ever be settled.

I am furthermore unable to separate *tumidus* as thus characterized from *damalis* Grd., and the close relationship existing between *damalis* and *cyprinus* has already been noticed by Professor Cope. As I now believe that *cyprinus*, *tumidus*, *damalis*, and *grayi* were all based on members of a single widely diffused species, I unite them in the above synonymy.

This species is the common Carp Sucker of Pennsylvania and the

Middle States. I have no specimens referable to this species from the Great Lakes, nor from the Mississippi or the Ohio. If *cyprinus*, *tumidus*, and *damalis* are identical, however, one of two things must be true. Either *C. cyprinus* really inhabits the whole Mississippi Valley, but has been overlooked or confounded with others, or else we have a very curious anomaly in the distribution of the species, it being an inhabitant of waters of two widely separated areas, having little in common. The former supposition seems the most probable, and I accordingly look for specimens of *C. cyprinus* in the Mississippi Valley.

Specimens in United States National Museum.

Number.	Locality.	Collector.
—	Round Lake, Montgomery, Alabama	Kumlien & Beau.
179	Fort Pierre, Nebr. (types of *C. damalis*)	Dr. Evans.
3550	Republican River	Wood & Hammond.
13012	Rio Grande, New Mexico (*grayi*)	Dr. O. Loew.
15891	Nebraska	
20109	"U. S. Mex. Boundary Survey" (types of *tumidus*?).	
—	Brownsville, Tex	

49. CARPIODES CARPIO (*Rafinesque*) *Jordan.*

Big Carp Sucker. Olive Carp Sucker.

1820—*Catostomus carpio* RAFINESQUE, Ich. Oh. 56.
Carpiodes carpio JORDAN, Bull. Buffalo Soc. Nat. Hist. 95, 1876.
Carpiodes carpio JORDAN, Man. Vert. 297, 1876.
Ichthyobus carpio NELSON, Bull. No. 1, Ills. Mus. Nat. Hist. 49, 1876.
Carpiodes carpio JORDAN & COPELAND, Check List, 158, 1876.
Carpiodes carpio JORDAN & GILBERT, in Klippart's Rept. 53, 1876.
Carpiodes carpio JORDAN, Proc. Ac. Nat. Sc. Phila. 72, 1877.
Carpiodes carpio JORDAN, Bull, U. S. Nat. Mus. ix, 34, 1877.
Carpiodes carpio JORDAN, Man. Vert. ed. 2d, 322, 1878.
1870—*Carpiodes nummifer* COPE, Proc. Am. Philos. Soc. Phila. 484.

HABITAT.—Mississippi Valley. Abundant in the Ohio River.

This is the most abundant species of its genus in the Ohio River and its tributaries. It is the largest species, the most elongate, and has the lowest fin-rays and the smallest head. The peculiar enlargement of the anterior rays of the dorsal I have found to be an excellent diagnostic character. This species has been well described by Professor Cope. under the name of *C. nummifer*. There can, however, be but little

doubt that Rafinesque had the same fish in mind as his *C. carpio*, and I have accordingly adopted the latter name.

Specimens in United States National Museum.

Number.	Locality.	Collector.
12291	Ohio River, Cincinnati	J. W. Milner.
12292	....do	Do.

Genus BUBALICHTHYS *Agassiz.*

Bubalichthys AGASSIZ, Am. Journ. Sci. Arts, 1855, 192.
Sclerognathus GÜNTHER, Cat. Fishes Brit. Mus. vii, p. 22, 1868.
Catostomus et *Carpiodes* sp. of authors.
Type, *Carpiodes urus* Agassiz.
Etymology, *βούβαλος*, buffalo; *ἰχθύς*, fish.

Head moderate or rather large, deep and thick, its superior outline rapidly rising, its length about 4 in that of the body: eye moderate, median or rather anterior in position; suborbital bones comparatively narrow; fontanelle always present and widely open.

Mouth moderate or small, more or less inferior, the mandible short, little oblique, or typically quite horizontal, the mandible less than one-third the length of the head, the premaxillaries in the closed mouth below the level of the lower part of the orbit; lips rather thin, thicker than in *Ichthyobus*, the upper protractile, narrow, plicate, the plicæ sometimes broken up into granules; lower lip comparatively full (for a Buffalo-fish), faintly plicate, the plicæ broken up into granules, the lower lip having the general ∩-shaped form seen in *Carpiodes;* jaws without cartilaginous sheath; muciferous system well developed; opercular apparatus well developed, but less so than in *Ichthyobus*, the operculum strongly rugose; isthmus moderate; pharyngeal bones triangular, with large teeth, which increase in size from above downwards; teeth compressed, their grinding edge blunt, slightly arched in the middle, and provided with a little cusp along the inner margin, which is hardly detached from the crown, and does not rise above the surface: gill-rakers of anterior arch slender and stiff above, growing shorter downwards.

Body ovate or oblong, the dorsal outline more or less arched, the sides of the body compressed, the ventral outline curved also, but to a less degree: scales very large, about equal over the body, their posterior

outlines somewhat serrate; lateral line well developed, nearly straight, with 35 to 42 scales, 12 to 14 in a cross-series from ventrals to dorsal; dorsal fin beginning near the middle of the body, somewhat in advance of the ventrals, its anterior rays elevated, their height about equal to half the base of the fin, the number of rays in the dorsal fin ranging from 25 to 32; caudal fin well forked, the lobes about equal, not falcate; anal fin comparatively long and rather low, of 8 or 9 developed rays; ventrals moderate, 10-rayed; pectorals rather short: sexual peculiarities, if any, unknown: coloration dull dark brown, nearly plain, not silvery; fins olivaceous or more or less dusky.

Air-bladder with two chambers.

Size quite large.

In general appearance, the species of *Bubalichthys* bear a considerable resemblance to those of *Carpiodes*. The form is, however, coarser than that of any *Carpiodes*, the dorsal fin is lower, and the coloration is darker and duller. The species reach a larger size than do those of *Carpiodes*, but whether larger or not than the species of *Ichthyobus* I am unable to say. In external appearance, *Bubalichthys* is intermediate between *Carpiodes* and *Ichthyobus*, the one species, *bubalus*, resembling *Carpiodes* most, the other, *urus*, being most like *Ichthyobus*.

Our knowledge of the species of this genus is very incomplete. Many species were named and indicated by Professor Agassiz, but with such fragmentary descriptions that not a single one of them is certainly known by any one. I have, however, been able to identify in specimens from Quincy, Ill., the fishes termed by him *B. bubalus* and *B. niger*, the small-mouthed and the large-mouthed Buffalo. Assuming these two well-separated species as a basis, I have compared with them numerous Buffalo-fishes from various localities, and in all cases I have found them identical with either the one or the other. I have therefore adopted the hypothesis, possible, and perhaps probable, that all of the nominal species of Professor Agassiz were based on the one or the other of these two forms. As to this, I may say that the sole basis of some of these nominal species was the difference in locality. From what we know of the range of other species of *Catostomidæ*, there is nothing antecedently improbable in the same fish being found in the Wabash and Mobile Rivers, or in the Tennessee and Osage. *Myxostoma macrolepidotum*, *Erimyzon oblongus*, *Minytrema melanops*, *Catostomus teres*, and others are known to occur in all four of those streams. The questions of locality may, I think, be safely eliminated from the discussion. The

descriptions published by Professor Agassiz are almost worthless for the distinction of species. It has accordingly seemed best to me, as a temporary arrangement, at least until *more than two* species are shown to occur in our waters, or until some one is able to show from examination of Professor Agassiz's types what he really had in mind, to distribute his nominal species in the synonymy of the two which we know. I have accordingly considered each of Agassiz's species and made it identical with either the small-mouthed or the large-mouthed species, as the description seemed to indicate. A third species, from Central America, which I suppose belongs to this genus, is added from Dr. Günther's description.

Generic Characterizations.

BUBALICHTHYS Agassiz, 1855.—"At the time I vindicated the propriety of restoring some of the genera established by Rafinesque among Cyprinoids, I did not suspect that the genus *Carpiodes*, as I then represented it, still contained two distinct types, though I had noticed that some of the species had the anterior margin of their dorsal greatly prolonged, whilst in others it hardly rises above the middle and posterior of that fin. Having since examined the pharyngeals of all the species of this tribe which I have been able to secure from different parts of the country, I find that those with a high dorsal which constitute the genus *Carpiodes*, have, in addition, very thin flat pharyngeals with extremely minute teeth, whilst those with a low dorsal have triangular pharyngeals with larger teeth, increasing gradually in size and thickness, from the upper margin of the bones towards the symphysis. The difference in form of these bones arises from the circumstance that the slight ridge upon the outer surface of the arch in *Carpiodes* is transformed in this second type into a prominent edge, dividing the outer surface of the arch into a posterior and anterior plane, meeting under an acute angle. This structural homology is satisfactorily traced by the difference of the external appearance of these two planes, the posterior one being full as the posterior half of the flat outer surface of the arch in *Carpiodes*, whilst the anterior plane is coarsely porous, indeed studded with deep pits analogous to the porous character of the anterior half of the outer surface of that bone in *Carpiodes*. The teeth themselves are compressed; their grinding edge is rather blunt, slightly raised in the middle, and provided with a little cusp along the inner margin, which is hardly detached from the crown, and does not rise above its surface, as in *Carpiodes*, *Ichthyobus* and *Cycleptus*.

"In this genus the bulk of the body is not placed so far forwards as in *Carpiodes*, the greatest height being between head and tail. The upper outline of the body is less strongly arched in advance of the dorsal; the head is longer than high, and the snout not more prominent than the mouth. The mouth opens obliquely downwards and forwards, the lower jaw being nearly as long as the upper. The lips are small and granulated. The anterior rays of the dorsal are not separately prolonged beyond the rest of the fin, though its anterior margin is higher than its middle and posterior portion. The lower fins are as in *Carpiodes*.

"The scales have many narrow radiating furrows upon the anterior field, none across the lateral fields, and few upon the posterior fields, converging to the centre of radia-

tion, to which the tubes of the lateral line extend also. For this new genus I propose the name of *Bubalichthys*, intending to recall the name of Buffalo fish, commonly applied to this species. To this genus belong the species I have described as *Carpiodes urus* from the Tennessee River, *C. taurus* from Mobile River, and *C. vitulus* from the Wabash, and also the *Catostomus niger* of Rafinesque and *Catostomus bubalus* of Dr. Kirtland from the Ohio, but not *C. bubalus* Rafinesque, which is the type of the genus *Ichthyobus* described in the following paragraph. I have another new species from the Osage River, sent me by Mr. George Stolley. This shows this type to be widely distributed in our western waters, but thus far it has not been found in the Atlantic states. I have some doubts respecting the nomenclature of these species which are rather difficult to solve. It will be seen upon reference to Rafinesque's Ichthyologia Ohiensis, p. 55 and 56, that he mentions two species of his subgenus *Ichthyobus*, one of which he calls *C. bubalus*, and the other *C. niger;* the second he has not seen himself, but describes it on the authority of Mr. Audubon as 'entirely similar to the common Buffalo fish,' his *C. bubalus*, but 'larger, weighing upwards of fifty pounds.' Dr. Kirtland, on the other hand, describes the *C. bubalus* as the largest species found in the western waters, and adds that the young is nearly elliptical in its outline and is often sold in the market as a distinct species under the name of Buffalo Perch. If there was only one species of Buffalo in those waters the case would be very simple, and the *Catostomus bubalus* and *niger* of Rafinesque, and *C. bubalus* of Dr. Kirtland, should simply be considered as synonymous, but Dr. Rauch of Burlington has sent me fine specimens of this Buffalo Perch, to which the remark of Dr. Kirtland, 'elliptical in its outline,' perfectly applies, and I find that it not only differs specifically but even generically from the broader, high backed, common Buffalo, and being the smaller species, I take it to be Rafinesque's *C. bubalus*, the type of his genus *Ichthyobus*, which is more fully characterised below, whilst the larger species, Rafinesque's *C. niger*, can be no other than Dr. Kirtland's *C. bubalus*, 'the largest species of the western waters.' It seems therefore hardly avoidable to retain the name of *C. niger* or rather *Bubalichthys niger* for the common Buffalo, though Rafinesque, who first named the fish, never saw it, or if he saw it mistook it for his own *bubalus*, and though Dr. Kirtland, who correctly describes and figures it, names it *C. bubalus*, for such is the natural result to which the history of the successive steps in our investigation of these fishes lead. But our difficulties here are not yet at an end. Among the splendid collections I received from Dr. Rauch, I found two perfectly distinct species of *Bubalichthys*, one with a large mouth, and the other with a small mouth, and one of *Ichthyobus*, living together in the Mississippi River, in the neighborhood of Burlington, Iowa; and the next question, probably never to be solved, will be, if they all three occur also in the Ohio, whether Rafinesque's *C. niger* was the big mouthed or the small mouthed *Bubalichthys*. Judging from the figure given by Dr. Kirtland in the Boston Journal of Natural History, vol. v, pl. fig. 2, I believe his *C. bubalus* to be the small mouthed species. I myself have, however, seen only one specimen of the big mouthed species from the Ohio, and that in rather an indifferent state of preservation; for which I am indebted to Prof. Baird, and none of the small mouthed species. Should, however, all three, as is possible, occur in the Ohio as well as the Mississippi, to avoid introducing new names, I will call the big mouthed species *B. niger*, preserving for it Rafinesque's specific name,—the small

mouthed, *B. bubalus*, retaining for it the name which Dr. Kirtland has given it, even though the species of *Ichthyobus* must bear the same specific name, being that originally applied by Rafinesque. It may be that either my *B. vitulus* or my *B. urus* is identical with Dr. Kirtland's *C. bubalus*, but until I can obtain original specimens of this species, this point must remain undecided, as it is impossible for mere descriptions to institute a sufficiently minute comparison. The specimens from Osage River I shall call *B. bonasus*.

"Compared with one another, these species differ as follows: *B. niger*, (the big-mouthed Buffalo) differs from *B. bubalus* (the small-mouthed Buffalo) by its larger mouth, opening more forwards; its more elongated body, the first rays of the dorsal rising immediately above the base of the ventrals, and its anterior lobe being broader, and the anal fin not emarginated; *B. bonasus* differs from *B. bubalus* and from *B. niger* in having the mouth larger than the first and smaller than the second, and from *B. bubalus* by its less emarginated dorsal, which renders its larger lobe broader, anal fin not emarginated, opercle larger. A farther comparison with the Southern species could only be satisfactory, if accompanied by accurate figures."—(AGASSIZ, *Am. Journ. Sc. Arts*, 1855, p. 192.)

SCLEROGNATHUS Günther, 1868.—"Scales of moderate or rather large size. Lateral line running along the middle of the tail. Dorsal fin much elongate, with about 30 or more rays, none of which are spinous. Anal fin short. Mouth small, inferior (*Bubalichthys*) or subterminal (*Sclerognathus*), with the lips more or less thickened. Barbels none. Gill-rakers long, stiff in the upper two-thirds of the first branchial arch, modified into low membranaceous transverse folds in the lower third. Pseudobranchiæ. Pharyngeal bones sickle-shaped, armed with a comb-like series of numerous, compressed teeth, increasing in size downwards."—(GÜNTHER, *Cat. Fishes Brit. Mus.* vii, 22, 1868.)

BUBALICHTHYS Cope & Jordan, 1877.—"Body oblong oval, compressed; dorsal elongate, elevated in front, of 20 or more rays; fontanelle present; pharyngeal bones strong, the teeth comparatively coarse and large, increasing in size downwards; mouth inferior."—(JORDAN, *Proc. Ac. Nat. Sc. Phila.* 1877, p. 82.)

ANALYSIS OF SPECIES OF BUBALICHTHYS.

* Body considerably elevated and compressed above; the dorsal region subcarinate; belly thicker; depth 2¼ to 2⅔ in length; axis of body above the ventrals below the lateral line and nearly twice as far from the back as from the belly: head moderate, triangular in outline when viewed from the side, 4 in length: eye equal to snout, 4 to 5 in length of head, much larger than in *B. urus*: mouth quite small, notably smaller and more inferior than in *B. urus*: mandible about equal to eye: dorsal fin elevated in front and rapidly declined, the highest ray reaching much beyond the middle of the fin, the seventh ray about half the length of the third or longest; anal rays rapidly shortened behind, the middle rays much shorter than the first long ones: scales 8–39–6; dorsal, 29; anal, 10; ventrals, 10: coloration paler, the lower fins slightly dusky ..... BUBALUS, 50.

** Body much less elevated and less compressed than in the preceding, the back not at all carinated; axis of body above ventrals about at the lateral line, and but very little farther from the dorsal outline than from the ventral; depth 3 to 3¼ in length: head very stout, strongly transversely convex, thicker, larger, and less pointed

than in the next, about 4 in length: eye about equal to snout, 5½ in head, much smaller than in *B. bubalus:* mouth large, considerably oblique, opening well forwards: mandible longer than eye: dorsal fin lower and less rapidly depressed than in the next, the longest ray scarcely half the length of the base of the fin; anal fin rounded, its rays not rapidly shortened, the middle ones not much shorter than the longest: colors very dark; fins all black: scales 8–41–7; dorsal, 30; anal, 10 ..... URUS, 51.

*** Mouth small, inferior, slightly corrugated: depth 3⅛ to 3¼ in length; head 4 to 4¼, not much longer than high: eye rather small, one-fifth of the length of the head and ⅔ that of the snout: suborbitals narrow. Anterior rays not much produced, shorter than the head; caudal forked. Origin of ventral vertically below the fourth dorsal ray. Pectoral fin not extending to ventrals. There are five longitudinal series of scales between the lateral line and the root of the ventral. Coloration uniform. Scales 7–38–7; dorsal 29; anal 10..... MERIDIONALIS, 52.

50. BUBALICHTHYS BUBALUS *Agassiz.*

Buffalo-fish. Small-mouthed Buffalo. High-backed Buffalo.

1838—*Catostomus bubalus* KIRTLAND, Rept. Zool. Ohio, 168. (Not of Rafinesque.)
Catostomus bubalus KIRTLAND, Boston Journ. Nat. Hist. v, 266, 1845.
Catostomus bubalus STORER, Synopsis, 424, 1846.
Bubalichthys bubalus AGASSIZ, Am. Journ. Sc. Arts, 2d series, xix, 195, 1855.
Bubalichthys bubalus JORDAN, Fishes of Ind., 222, 1875.
Bubalichthys bubalus JORDAN & COPELAND, Check List, 158, 1876.
Bubalichthys bubalus JORDAN, Proc. Ac. Nat. Sc. Phila. 74, 1877.
Bubalichthys bubalus JORDAN & GILBERT, in Klippart's Rept. 53, 1877.

1854—*? ? Carpiodes taurus* AGASSIZ, Am. Journ. Sci. Arts, 355. (Not identifiable.)
? ? Bubalichthys taurus AGASSIZ, Am. Journ. Sc. Arts, 2d series, xix, 193, 1855.
? ? Bubalichthys taurus JORDAN & COPELAND, Check List, 158, 1876.

1854—*? ? Carpiodes vitulus* AGASSIZ, Am. Journ. Sci. Arts, 356. (Not identifiable.)
? ? Bubalichthys vitulus AGASSIZ, Am. Journ. Sc. Arts, 2d series, xix, 193, 1855.
? ? Bubalichthys vitulus JORDAN & COPELAND, Check List, 158, 1876.
? ? Bubalichthys vitulus JORDAN & GILBERT, in Klippart's Rept. 53, 1876.

1868—*Sclerognathus urus* GÜNTHER, Cat. Fishes Brit. Mus. vii, 22.

1876—*Ichthyobus cyanellus* NELSON, Bull. No. 1, Ills. Mus. Nat. Hist. 49.
Ichthyobus cyanellus JORDAN & COPELAND, Check List, 158, 1876.
Ichthyobus cyanellus JORDAN, Proc. Ac. Nat. Sc. Phila. 73, 1877.
Ichthyobus cyanellus JORDAN & GILBERT, in Klippart's Rept. 53, 1876.
Ichthyobus cyanellus JORDAN, Man. Vert. ed. 2d, 323, 1878.

1877—*Bubalichthys altus* NELSON, MSS.
Bubalichthys altus JORDAN, Proc. Ac. Nat. Sc. Phila. 73, 1877.
Bubalichthys altus JORDAN, Man. Vert. ed. 2d, 324, 1878.

1877—*Bubalichthys bubalinus* JORDAN, Bull. U. S. Nat. Mus. ix, 50.
Bubalichthys bubalinus JORDAN, Man. Vert. ed. 2d, 325, 1878.

HABITAT.—Mississippi Valley; abundant in all the larger streams.

This is probably the most generally distributed of the various species known popularly as Buffalo-fish. The question as to its proper nomenclature is even more complicated than that of the next species. It may be that this is the true *bubalus* of Rafinesque, as supposed by Dr. Kirtland. But as that species was the type of the genus *Ictiobus*, the identification of Rafinesque's species with the present one would lead to changes in nomenclature far from desirable. The name *Ichthyobus* would then belong to *Bubalichthys* and the genus *Ichthyobus* would receive a new name. As this can never be proven, it is best to consider Agassiz's identification as correct and that of Dr. Kirtland wrong. The first mention of this species was that of Dr. Kirtland as *Catostomus bubalus*. The name *bubalus*, however, was given through an erroneous identification, and must be passed over. Next come Agassiz's names *taurus* and *vitulus*, both possibly belonging here, but just as likely belonging to *urus*. Both of them, from the exasperating insufficiency and irrelevance of the descriptions, are practically unidentifiable. Next is Agassiz's *bubalus*, noticed below. The next name in order is that of *Ichthyobus cyanellus* Nelson, which was based on this species, as I have ascertained by examination of his type. This is the first tenable name *certainly* belonging to this species, unless we adopt the name *bubalus*. Next comes Nelson's *altus*. A specimen answering Nelson's description in all respects, and as evidently belonging to the species now under consideration, is at present before me. It is a fine *adult* example. Lastly comes my own *bubalinus*, intended merely as a substitute for the name "*bubalus*", not then considered tenable as the specific name of this species, having been given to it originally by an error in identification. The adoption of the name *bubalus* by Agassiz after the knowledge of this error may, however, be considered as a proposal of a new name. The original descriptions of *taurus*, *vitulus*, *cyanellus*, and *altus* are here subjoined.

Carpiodes taurus Agassiz, Am. Journ. Sci. Arts, 1855, p. 355.—"From Mobile River, Alabama. The form of the body is intermediate between that of *C. Cyprinus* and *C. Urus*. The gill-cover has the same form as in *C. Urus*, but it is larger and more strongly arched behind. The hind margin of the scales is waving, owing to a somewhat prominent middle angle. The anterior rays of the dorsal equal in length two-thirds of that of the base of the fin. Anal not lunate behind. The ventrals do not reach to the anal opening. Caudal not so deeply furcate as in *C. Cyprinus*."

Carpiodes vitulus Agassiz, Am. Journ. Sc. Arts, 1855, p. 356.—"From the Wabash River, Indiana. This seems to be a smaller species than the preceding ones. The form of the body resembles that of *C. Taurus*, but the eyes are smaller; the opercle is more broadly rounded behind; the subopercle has its posterior and free border regularly arched above and below, and not emarginate as in *C. Taurus*. The direction of the numerous water-tubes on the head and cheeks also differ. The upper and lower border of the scales are nearly straight. The dorsal does not extend quite so far forward. I am indebted to Col. Richard Owen of New Harmony for this species."

Ichthyobus cyanellus Nelson, Bull. Ills. Mus. Nat. Hist. i, 1877, p. 49.—"Blue Buffalo. A number of specimens of this species are in the state collection, from the Illinois river, and in Prof. Jordan's collection, from the Mississippi at St. Louis. The following is the description, taken from several specimens, measuring from 8 to 9¼ inches in length:—

"Head about 3⅓ in length. Depth 2⅓ to 5–6. Eye 4⅓ to 5½ in head. Dorsal I, 30. Anal I, 8. Ventrals 10. Lat. l. 38. Longitudinal rows 7–5 to 7–6. Body compressed, high. Anteriorly broad, compressed behind. Longest ray reaching 18th ray. Pectorals shorter than ventrals, both shorter than head. Anal scarcely reaching caudal; head very short, high and thick; its thickness ¾ length, depth 1⅓ in length. Mouth quite small, oblique, and overlapped by a slightly projecting snout. Mandible short, 4 in head. Opercle becoming wrinkled with age. Head small, short and thick; muzzle obtuse, conic, not twice the length of eye. Anterior ray of dorsal, in type from Illinois river, slightly nearer snout than base of caudal. In specimens from St, Louis the dorsal is about equidistant. Color above, light steel blue in adults, becoming lighter below. Young lighter with distinct stripes along the rows of scales. Although the species is described from specimens but nine inches long, when full grown it undoubtedly reaches similar dimensions to its congeners."

Bubalichthys altus Nelson, MSS.; Proc. Acad. Nat. Sc. Phila. 1877, 74.—"This specimen is very deep and much compressed. The back is much arched and the profile descends steeply in front to end of snout, not forming an angle with it as in many species of *Ichthyobus*.

"Depth of body, 2½ in length; head, 4 in length; greatest thickness of body, 1⅔ in length of head; depth of head, 1⅓ in its length; width, 1½ in length. Eye, 5½ in head, 2½ in interorbital space, which is but little rounded.

"Lateral line perfectly straight from upper edge of opercle to caudal.

"Scales, 8–35–5. Dorsal I. 25; A. I. 9.

"Color in spirits, dull yellowish olive; fins dusky.

"Type specimen 12 inches long, in Ills. State Museum, from Cairo, Illinois."

51. BUBALICHTHYS URUS *Agassiz.*

Big-mouthed Buffalo. Black Buffalo. Mongrel Buffalo.

1818—?? *Amblodon niger* RAFINESQUE, Journal de Physique Phila. 421. (Entirely unrecognizable.)

?? *Catostomus niger* RAFINESQUE, Ichth. Oh. 56, 1820. (Unrecognizable; more likely *Cycleptus elongatus.*)

Bubalichthys niger AGASSIZ, Am. Journ. Sc. Arts, 2d series, xix, 195, 1855.

Bubalichthys niger JORDAN, Fishes of Ind. 222, 1875.

Bubalichthys niger JORDAN, Bull. Buffalo Soc. Nat. Hist. 95, 1876.

Bubalichthys niger JORDAN, Man. Vert. 298, 1876.

Bubalichthys niger NELSON, Bull. No. 1, Ills. Mus. Nat. Hist. 50, 1876.

Bubalichthys niger JORDAN & COPELAND, Check List, 158, 1876.

Bubalichthys niger JORDAN, Proc. Ac. Nat. Sc. Phila. 75, 1877.

Bubalichthys niger JORDAN & GILBERT, in Klippart's Rept. 53, 1876.

Bubalichthys niger JORDAN, Bull. U. S. Nat. Mus. ix, 34, 1877.

Bubalichthys niger JORDAN, Man. Vert. ed. 2d, 323.

1854—*Carpiodes urus* AGASSIZ, Am. Journ. Sc. Arts, 355.

Bubalichthys urus AGASSIZ, Am. Journ. Sc. Arts, 2d series, xix, 193, 1855.

Bubalichthys urus PUTNAM, Bull. Mus. Comp. Zool. 10, 1863.

Bubalichthys urus JORDAN, Fishes of Ind. 222, 1875.

Bubalichthys urus JORDAN & COPELAND, Check List, 158, 1876.

1855—*Bubalichthys bonasus* AGASSIZ, Am. Journ. Sc. Arts, 2d series, xix, 195.

Bubalichthys bonasus JORDAN & COPELAND, Check List, 158, 1876.

HABITAT.—Mississippi Valley, in the larger streams.

This is an abundant species in the Mississippi and its larger tributaries. It is very distinct from the preceding, almost intermediate between *Bubalichthys bubalus* and *Ichthyobus bubalus.* It may indeed be necessary to unite these two genera on account of this species.

The question of the name which should be borne by this species is a very difficult one. Inasmuch as Rafinesque's *C. niger* was known to him only through the accounts of Mr. Audubon, a gentleman known to have played several practical jokes on the too credulous naturalist, and to have led him thereby to describe and name several impossible animals, and inasmuch as no real description whatever is given by Rafinesque, it seems to me that the name *niger* can be used only on the authority of Agassiz, and not on that of Rafinesque. That being the case, the name

urus of Agassiz, which unquestionably belongs to this species, has a year's priority over *niger*, and is really the first tenable name applied to any species of *Bubalichthys*. The original account given by Rafinesque of his *Catostomus niger* and that by Professor Agassiz of his *Bubalichthys urus* I here append. Agassiz's descriptions of *B. niger* and *B. bonasus* have been previously given under the head of the genus.

Catostomus (*Ictiobus*) *niger* Raf. Ich. Oh. p. 56.—"Entirely black; lateral line straight; I have not seen this fish. Mr. Audubon describes it as a peculiar species found in the Mississippi and the lower part of the Ohio, being entirely similar to the common Buffalo-fish, but larger, weighing upwards of fifty pounds, and living in separate schools."

Carpiodes urus Agassiz, Am. Journ. Sci. Arts, 1854, p. 355.—"From the Tennessee River. It grows very large, weighing occasionally from 30 to 40 pounds. The body in this species is not so high as in *C. cyprinus*, nor is it so compressed above; the scales are also not so high, but more angular behind, and the anterior portion of the dorsal is not so elongated. The gill-cover is larger, and the distance from the hind border of the eye to the inferior angle of the subopercle near the base of the pectorals and the distance from the same point to the superior and posterior angle of the opercle, are nearly equal. In *C. cyprinus* the distances differ by nearly one third. The subopercle is not triangular, but its hind border is nearly regularly arched from the upper angle to the posterior angle of the interopercle. The anal has its posterior margin full and not lunate; the caudal is not so deeply furcate as in *C. cyprinus*. The ventrals do not reach the anal. All fins are of a dark color. I am indebted to Dr. Newman for this species."

I found no specimens of *Bubalichthys urus* in the collections of the United States National Museum.

52. BUBALICHTHYS MERIDIONALIS (*Günther*) *Jordan*.

Central American Buffalo.

1868—*Sclerognathus meridionalis* GÜNTHER, Trans. Zool. Soc. p. —.

Sclerognathus meridionalis GÜNTHER, Cat. Fishes Brit. Mus. vii, 23, 1868.

HABITAT.—Rio Usumacinta, Guatemala.

I know nothing of this species except from Günther's description. From its remote locality, it is probably distinct, but the description shows no especial difference from *B. bubalus*, unless it be that the body is slenderer. The following is Dr. Günther's account:—

"D. 29–30. A. 10; lat. l. 38, l. transv. 7½–7½. Mouth small, inferior,

slightly corrugated. The height of the body is contained thrice and one third or thrice and one fourth in the total length (without caudal), the length of the head four times or four times and a half; head not much longer than high. Eye rather small, one fifth of the length of the head and two thirds of that of the snout; suborbitals narrow. The anterior dorsal rays are not much produced, being shorter than the head. Caudal fin forked. The origin of the ventral fin is vertically below the fourth dorsal ray. Pectoral fin not extending to the ventral. There are five longitudinal series of scales between the lateral line and the root of the ventral. Coloration uniform. Pharyngeal teeth very numerous and small, increasing somewhat in size downwards.

"Rio Usumacinta (Guatemala)."

Genus ICHTHYOBUS *Rafinesque.*

Amblodon RAFINESQUE, Journal de Physique, de Chymie et d'Histoire Naturelle, Paris, 421, 1819. (Part.)

Ictiobus RAFINESQUE, Ich. Oh. 1820, p. 55. (As subgenus of *Catostomus.*)

Ichthyobus AGASSIZ, Am. Journ. Sci. Arts, 1855, p. 195.

Type, *Amblodon bubalus* Rafinesque.

Etymology, *ἰχθύς*, fish; *βοῦς*, bull or buffalo; *i. e.*, buffalo-fish.

Head very large and strong, wide and deep, its length 3½ to 3¾ in that of the body, its upper surface broad and depressed; eye moderate, wholly anterior in position, the middle of the head being entirely behind it; suborbital bones proportionately narrow; fontanelle large, well open; opercular apparatus largely developed, the suboperculum broad, the operculum broad, strongly furrowed.

Mouth very large for a Sucker, terminal, protractile forwards, the middle of the premaxillaries rather above the line of the middle of the eye, the posterior edge of the maxillary extending about to the line of the nostrils; mandible very strong, oblique, placed at an angle of 45 degrees or more when the mouth is closed, its posterior end extending to beyond opposite the front of the eye, its length a little less than one-third that of the head. Lips very little developed, the upper narrow and smooth, scarcely appreciable, the lower narrow, rather full on the sides, but reduced to a narrow rim in front, entirely destitute both of papillæ and plicæ; jaws without cartilaginous sheath; muciferous system of head well developed; isthmus narrow; pharyngeal bones in form intermediate between those of *Carpiodes* and those of *Bubalichthys*, the outer surface of the arch standing outwards, and presenting a porous

outer margin. The peduncle of the symphysis is much longer proportionally and more pointed than in *Carpiodes* and *Bubalichthys*. The teeth are very numerous, small, thin and compressed in *Carpiodes*, but the lower ones are gradually larger than the upper ones. Their inner edge is slanting outwards, and not uniformly arched as in *Bubalichthys*, or truncate as in *Cycleptus*, the innermost margin rising somewhat in the shape of a projecting cusp. Gill-rakers of anterior arch long and slender above, becoming shorter downwards.

Body heavy, robust, not especially arched above nor greatly compressed, the form somewhat elliptical, the depth 2½ to 3½ in the length of the body.

Scales large, thick, nearly equal over the body, their posterior edges somewhat serrate, the lateral line well developed, but not as distinct as in *Carpiodes*, slightly decurved anteriorly, the number of scales in its course 36 to 42; 13 to 15 in a transverse series from dorsal to ventrals.

Dorsal fin with an elongate basis, its number of rays 25 to 30, the anterior rays somewhat elevated, their length about half that of the base of the fin; caudal not much forked; anal fin not much elevated, its rays about 9 in number; pectorals and ventrals moderate, the latter with about 10 rays.

Sexual peculiarities, if any, unknown. Coloration dark, not silvery, above dusky olive; lower fins more or less black.

Air-bladder with two chambers.

Size very large.

The claim of this group to generic rank has been questioned by Professor Cope and others. The differences in the pharyngeal teeth are perhaps hardly sufficient to distinguish it from *Carpiodes*, but at present I am inclined to think that the great development of the mandible, which forms a large and terminal mouth, amply sufficient for generic distinction. The relations of the group to *Bubalichthys* are doubtless, in reality, closer. *Ichthyobus* bears much the same relation to *Bubalichthys* that *Chasmistes* does to *Catostomus*, and, so far as the mouth is concerned, but in a greater degree, that *Hrimyzon* bears to *Minytrema* and *Placopharynx* to *Myxostoma*. The head of *Ichthyobus* is much larger and stouter, and the whole body more robust and less compressed than in *Carpiodes*. I know from autopsy but a single species of *Ichthyobus*. It has, however, been described under several different names. So far as is known, the genus is confined to the valley of the Mississippi, no species having been recorded from the Great Lakes, or from any streams

east of the Alleghanies. No members of the suborders *Cycleptinæ* and *Bubalichthyinæ* are known from the United States west of the basin of the Rio Grande.

The typical species was first described under the name of *Amblodon*. The genus *Amblodon* of Rafinesque, 1819, is based on the same species as his *Ictiobus* of 1820. The name *Amblodon*, however, was given in allusion to the pharyngeal teeth of *Haploidonotus grunniens*, popularly supposed to be the teeth of the Buffalo-fish, the presence of which teeth was supposed to distinguish *Amblodon* from *Catostomus*. This error was afterwards discovered by Rafinesque, and the name *Amblodon* transferred to the Sciænoid fish. As *Amblodon* of Rafinesque included the present genera *Haploidonotus* and *Ichthyobus*, erroneously confounded, and as on the discovery of this error its author restricted the name to *Haploidonotus*, I think that we are justified in retaining *Ichthyobus* instead of *Amblodon* for the genus of Catostomoids.

Generic Characterizations.

AMBLODON Rafinesque, 1819.—"16. AMBLODON. (*Abdominal.*) Différent du genre *Catostomus*. Machoire inférieure pavée de dents osseuses serrées arrondies, à couronne plate, inégales.—Les poissons de ce genre, qui abondent dans l'Ohio, le Missouri et le Mississippi, sont distingnées par le nom vulgaire de Buffaloe-Fish (Poisson bouffle) et les François de la Louisiane les nomment Piconeau. Il y en a plusieurs espèces qui parviennent souvent à une très grosse taille. Les deux suivants habitent dans l'Ohio. 1. *A. bubalus*. Brun olivâtre pâle dessous, joues blanchâtres. D. 28, A. 12, P. 16, A. 9, C. 24. L'*A. niger* est entièrement noir; tous deux ont la ligne latérale droite, queue bilobée, tête tronquée, etc. Ils sont très-bons à manger."—(RAFINESQUE, *Journal de Physique, etc.* p. 421.)

ICTIOBUS Rafinesque, 1820.—"Body nearly cylindrical. Dorsal fin elongated, abdominal fins with nine rays, tail bilobed, commonly equal."—(RAFINESQUE, *Ichthyologia Ohiensis*, p. 55.)

ICHTHYOBUS Agassiz, 1855.—"In the form and position of the fins, as well as in the general outline of the body, this genus is very nearly related to *Bubalichthys*, but in the structure of the parts of the head, it is quite dissimilar. The mouth opens directly forwards, and is large and round. The lips are small, smooth and thin; the upper one is not thicker than the intermaxillary itself, and tapers to a narrow edge. At the symphysis of the lower jaw, which is larger than in any other genus of this group, the lower lip is hardly more than a thin membrane connecting its small lateral lobes.

"The eye is small, and the opercular pieces very large.

"The scales have many narrow radiating furrows upon the anterior field; none across the lateral fields, few upon the margin of the posterior field and these not extending to the centre of radiation. Tubes of the lateral line straight and simple, arising nearly in the middle of the posterior field.

"Pharyngeal bones are neither flat as in *Carpiodes* nor triangular as in *Bubalichthys*,

but present an intermediate form; the outer surface of the arch standing outwards and presenting a porous outer margin. The peduncle of the symphysis is much longer proportionally and more pointed than in *Carpiodes* and *Bubalichthys*. The teeth are very numerous, small, thin and compressed as in *Carpiodes*, but the lower ones are gradually larger than the upper ones. Their inner edge is slanting outwards, and not uniformly arched as in *Bubalichthys* or truncate as in *Cycleptus*, the innermost margin rising somewhat in the shape of a projecting cusp."—(AGASSIZ, *Am. Journ. Sc. Arts*, 1855, p. 196.)

ICHTHYOBUS Cope & Jordan, 1877.—"Body oblong oval, compressed; dorsal elevated in front, of 20 or more rays; fontanelle present; pharyngeal bones narrow, with the teeth relatively thin and weak; mouth large, subterminal, protractile forwards."—(JORDAN, *Proc. Ac. Nat. Sc. Phila.* 1877, p. 82.)

ANALYSIS OF SPECIES OF ICHTHYOBUS.

* Body robust, moderately compressed, the outline somewhat elliptical, but the back rather more curved than the belly; depth 2½ to 3½ in length: head very large and thick, 3½ in length of body: opercular apparatus very strong, the operculum itself forming nearly half the length of the head: scales very large: developed rays of the dorsal 27 to 29; anal rays 9; ventrals 10: scales 7-37 to 41-6: coloration dull brownish-olive, not silvery; fins dusky: size very large, reaches a length of nearly three feet and a weight of 20 to 30 pounds..... BUBALUS, 53.

53. ICHTHYOBUS BUBALUS (*Rafinesque*) *Agassiz.*

Red-mouth Buffalo Fish. Large-mouthed Buffalo.

1818—*Amblodon bubalus* RAFINESQUE, Journal de Physique, 421.
Catostomus bubalus RAFINESQUE, Am. Month. Mag. and Crit. Rev. 354, 1818.
Catostomus bubalus RAFINESQUE, Ich. Oh. 55, 1820.
Icthyobus bubalus AGASSIZ, Am. Journ. Sc. Arts, 2d series, xix, 196, 1855.
Icthyobus bubalus JORDAN, Fishes of Ind. 222, 1875.
Ichthyobus bubalus JORDAN, Bull. Buffalo Soc. Nat. Hist. 95, 1876.
Icthyobus bubalus JORDAN, Man. Vert. 298, 1876.
Icthyobus bubalus NELSON, Bull. No. 1, Ills. Mus. Nat. Hist. 49, 1876.
Icthyobus bubalus JORDAN & COPELAND, Check List, 158, 1876.
Icthyobus bubalus JORDAN & GILBERT, in Klippart's Rept. 53, 1876.
Icthyobus bubalus JORDAN, Proc. Ac. Nat. Sc. Phila. 72, 1877.
Icthyobus bubalus JORDAN, Bull. U. S. Nat. Mus. ix, 34, 1877.
Ichthyobus bubalus JORDAN, Man. Vert. ed. 2d, 322.
1844—*Sclerognathus cyprinella* CUVIER & VALENCIENNES, Hist. Nat. des Poissons, xvii, 477, pl. 518.
Sclerognathus cyprinella STORER, Synopsis, 428, 1846.
Ichthyobus cyprinella AGASSIZ, Am. Journ. Sci. Arts, 196, 1855.
Sclerognathus cyprinella GÜNTHER, Cat. Fishes, Brit. Mus. vii, 24, 1868.
Ichthyobus cyprinella JORDAN, Man. Vert. 298, 1876.
Ichthyobus cyprinella JORDAN & COPELAND, Check List, 158, 1876.
1855—*Icthyobus rauchii* AGASSIZ, Am. Journ. Sc. Arts, 2d series, xix, 196.

Ichthyobus rauchii PUTNAM, Bull. Mus. Comp. Zool. 10, 1863.
Ichthyobus rauchii JORDAN & COPELAND, Check List, 158, 1876.
Ichthyobus rauchii JORDAN & GILBERT, in Klippart's Rept. 53, 1876.
Ichthyobus rauchii JORDAN, Man. Vert. ed. 2d, 323, 1878.

1855—*Ichthyobus stolleyi* AGASSIZ, Am. Journ. Sc. Arts, 2d series, xix, 196.
Ichthyobus stolleyi JORDAN & COPELAND, Check List, 158, 1876.

1877—*Ichthyobus ischyrus* NELSON, MSS.—JORDAN, Proc. Ac. Nat. Sc. Phila. 72.
Ichthyobus ischyrus JORDAN & COPELAND, Check List, 158, 1876.
Ichthyobus ischyrus JORDAN & GILBERT, in Klippart's Rept. 53, 1876.
Ichthyobus ischyrus JORDAN, Man. Vert. ed. 2d, 323, 1878.

HABITAT.—Mississippi Valley; generally abundant in the larger streams.

An examination of a large series of wide-mouthed Buffalo fishes from the Ohio, Wabash, Illinois, and Mississippi Rivers has convinced me, contrary to my previous impressions, that all belong to a single species. It is not absolutely certain what Rafinesque's *Catostomus bubalus* was. It is perhaps as likely to have been a species of *Bubalichthys*, as supposed by Dr. Kirtland, as an *Ichthyobus*. I however follow Professor Agassiz in identifying it with the present species, which is, at the Falls of the Ohio, where Rafinesque's collections were made, probably the most abundant of the Buffalo-fishes. Neither Rafinesque nor Professor Agassiz has, however, recognizably described the species. In my Manual of Vertebrates, in 1876, I gave a short account of *Ichthyobus bubalus*, drawn from two large specimens taken in Wabash River at Lafayette. Besides these, I have numerous smaller specimens, obtained in the Mississippi at Saint Louis. As these differed in the greater compression of the body and higher fins, I have identified them as belonging to *Ichthyobus rauchii* Agassiz, an identification which I still think correct. In 1877, Mr. Nelson described an *Ichthyobus ischyrus*, from Mackinaw Creek, a tributary of the Illinois River, near Peoria. His typical specimen was very stout and deep, and at the time I thought with him that it was probably distinct from *I. bubalus*. Lately I have been enabled to re-examine the type of *I. ischyrus* in the State Museum of Illinois, and to compare it with a numerous series from the same locality. I found it possible to establish an unbroken series among them, connecting the nominal species which I had termed *bubalus*, *rauchii*, and *ischyrus*, the differences separating them being, in my opinion, due either to differences of age or to individual peculiarities. As no description of any importance has been published of *I. stolleyi*, I include it as a synonym of *I. bubalus*. I know nothing whatever concerning it. *Ichthyobus cyanellus* Nelson, as below stated, is a species of

Bubalichthys. The description of *Sclerognathus cyprinella* Valenciennes refers principally to the generic features of these fishes. It agrees fully with *I. bubalus*, except in the number of scales above the lateral line, a difference doubtless due to a difference in the place or the manner of making the count. As no specific characters are known, and as the *Ichthyobus bubalus* doubtless abounds in the Lower as in the Upper Mississippi, I refer *I. cyprinella* to the synonymy of *I. bubalus*, the original type having probably been a young specimen of that species. This species is perhaps the largest of the *Catostomidæ*, reaching a weight of 20 to 30 pounds and a length of more than two feet. The young ("*ischyrus*") are sold in the Illinois markets under the name of Red-mouth Buffalo, the adult being called simply Buffalo. A species which I suppose to be the present one I have seen taken in immense numbers, by means of seines, in the Mississippi River at Burlington, Iowa. The flesh is good, although not first-rate. It is rather coarse, and is full of small bones.

For purposes of comparison I here add the original descriptions of *S. cyprinella*, *I. rauchii*, *I. stolleyi*, and *I. ischyrus*:—

SCLEROGNATHUS CYPRINELLA Valenciennes.—"Rien ce me semble, ne justifie mieux la séparation des scélérognathes du genre des Catostomes que l'espèce dont je vais donner ici la description. Avec une bouche, formée comme celle du *Sclerognathus cyprinus*, nous voyons l'ouverture portée au bout du museau, la lèvre inférieure plus longue que la supérieure, et par consequent il n'y a plus de possibilité d'employer la bouche pour sucer.

"Ce poisson a le corps assez semblable au précédent [*Sclerognathus cyprinus*]; sa hauteur est trois fois et un tiers dans sa longueur totale; la longueur de la tête y est comprise quatre fois et demie; l'œil est petit, et sur le haut de la joue, le diamètre est contenu cinq fois et un tiers dans la tête, et deux diamètres et demi, donnant la mesure de l'intervalle entre les deux yeux; le dessus du crâne, couvert comme à l'ordinaire, d'une peau nue est moins convexe; les deux lignes de pores sont tracées à leur place ordinaire, et sont sinueuses, comme celles de l'espèce précédente; l'opercule est strié et bombé et est plus grand, ce qui rend le sous-opercule plus petit que dans l'autre sclérognathe. L'on sent les intermaxillaires à l'extrémité supérieure du museau, soutenant un lèvre très mince. L'inférieure est moins épaisse, et le nombre des papilles est moins faible. La dorsale a la même forme que celle de l'autre espèce; mais l'anale est plus pointue; la caudale est échancrée et large.

"D. 33. A. 12, etc.

"Les écailles sont beaucoup plus petites; j'en compte quarante et une le long des côtés; dix au dessus, et sept au dessous de la ligne latérale, qui est étroite et mince.

"La couleur est un doré verdâtre, avec les nageoires plus foncées.

"Notre individu est long de sept pouces; il vient du Lac Pontchartrain."—(VALENCIENNES, *Hist. Nat. des Poiss.* xvii, pp. 477–479.)

ICHTHYOBUS RAUCHII Agassiz.—"Dorsal much higher than in *I. bubalus*, all other fins much larger, and the scales much higher than long; from Burlington, Iowa."

ICHTHYOBUS STOLLEYI Agassiz.—"Body higher than in *Ichthyobus rauchii*, profile steeper, and hence snout blunter, opercular bones larger; fins proportionally of the same size. From Osage River, Missouri."

ICHTHYOBUS ISCHYRUS Nelson.—"This is a very stout and heavily built species: depth 2¼ in length; head extremely broad between the eyes and but slightly convex; its length 3¼ times in length of body; snout short and rounded, opercular apparatus large; depth of head 1⅓ in its length; width of head 1½; eye 6⅓ in head, 1⅓ in snout, 4 in interorbital space; caudal peduncle a little deeper than long; scales 7-37-7, nearly uniform, a little crowded anteriorly, finely punctate; fins all small; dorsal I, 27; anal I, 8, bluish olive above; yellowish below; fins blackish."

Specimens in United States National Museum.

Number.	Locality.	Collector.
20774	Illinois River at Peoria (very large; typical of *bubalus*)....	S. A. Forbes.

Genus MYXOCYPRINUS *Gill.*

Myxocyprinus GILL, Johnson's Cyclopædia, p. 1574, 1878.

Carpiodes et Sclerognathus sp. BLEEKER, GÜNTHER.

Type, *Carpiodes asiaticus* Bleeker.

Etymology, μυξαω, to suck; κύπρινος, a carp.

This genus is known to me only from Dr. Bleeker's description of its typical species. Whether it differs from its relatives, *Ichthyobus*, *Bubalichthys*, etc., in any other character than the obvious one of the great increase in the number of its dorsal rays and the smaller scales, I do not know. In any event, however, its right to independent generic rank is unquestionable.

Generic Characterizations.

MYXOCYPRINUS Gill, 1878.—"*Myxocyprinus* is a name proposed for the *Carpiodes asiaticus* of Bleeker, which is distinguished by the multiradiate dorsal and anal fins (*e. g.* D. 52; A. 13)."—(GILL, *Johnson's Cyclopædia, Appendix*, p. 1574.)

54. MYXOCYPRINUS ASIATICUS (*Bleeker*) *Jordan.*

1864—***Carpiodes asiaticus*** BLEEKER, Nederl. Tydschr. Dierk. ii, 19.

Sclerognathus asiaticus GÜNTHER, Cat. Fishes Brit. Mus. vii, 23, 1868.

HABITAT.—China.

My only knowledge of this species is from Dr. Bleeker's original description, which I here subjoin:—

"CARPIODES ASIATICUS Blkr.—Carpiod. corpore oblongo compresso, altitudine 2⅓ fere in ejus longitudine absque, 3⅓ circiter in longitudine corporis cum pinna caudali,

dorso valde elevato maxime compresso; latitudine corporis 2¼ circiter in ejus altitudine; capite obtuso 5 fere in longitudine corporis absque 6 circiter in longitudine corporis cum pinna caudali; oculis in media capitis longitudine sitis, diametro 5 circiter in longitudine capitis, diametris 2½ circiter distantibus; linea rostro-dorsali vertice et fronte declivi rectiuscula, rostro valde convexa; naribus orbitæ approximatis, posterioribus valvula claudendis; rostro obtuso truncatiusculo valde carnoso ante rictum prominente; labiis valde carnosis papillatis, inferiore lobis parum productis; osse suborbitali anteriore sat longe ante orbitam sito, scaphæformi, duplo circiter longiore quam alto apice acuto antrorsum spectante; osse suborbitali 2° obliquo tetragono æque alto circiter ac longo; ossibus suborbitalibus ceteris gracilibus oculi diametro quadruplo circiter humilioribus; operculo duplo circiter altiore quam lato marginibus posteriore et inferiore convexo; osse scapulari valde brevi et obtuso; ossibus pharyngealibus compressis sat validis altioribus quam latis, dentibus 30 ad 50 compressis corona vulgo unituberculatis; squamis dimidio libero et dimidio basali subradiatim striatis, 50 in linea laterali, 24 in serie transversali absque ventralibus infimis quarum 12 lineam lateralum inter et initium pinnæ dorsalis; squamæ linea laterali postice medio emarginatis; linea lateralis singulis squamis tubulo simplice marginem squamarum liberum attingente notata; pinnis dorsali et anali basis vagina squamosa inclusa, dorsali basi non multo plus que 2 in longitudine totius corporis, longe ante pinnas ventrales incipiente, antice valdo elevata corpore vix humiliore, acuta, valde emarginata, medio et postice corpore quadruplo circiter humiliore radio postico radio anali postico subopposito; pinnis pectoralibus rotundales capite longioribus, ventrales non attingentibus; ventralibus acute rotundatis pectoralibus non multo brevioribus, analem non attingentibus; anali corpore minus duplo humiliore, duplo altiore quam basi longa, acutiuscule rotundata non emarginata; caudali profunde emarginata lobis acutis 4½ cerciter in longitudiné corporis; colore corpore fuscescente-olivaceo, pinnis fusco vel fusco-violaceo.

"B. 3. D. 4–49. P. 1-17. V. 2-11. A. 3–11 vel 4–10. C. 1-16–1 et lat. brev.

"Hab. China.

"Longitudo speciminis descripti 508'''.

"Rem. La présence de Catostomini dans les eaux de l'Asie orientale est un fait assez curieux. Tilesius déjà en avait fait connaître un représentant, vivant dans le Covyma, dans le Léna, l'Indigirca et le Dogdo, espèce qu'il nomma Cyprinus rostratus, que M. Valenciennes rebaptisa Catostomus Tilesii et qui paraît être un Acomus. Mais cette espèce était jusqu'ici la seule du groupe qu'on savait habiter l'Asie. L'espèce actuelle prouve l'existence dans les fleuves de l'Asie orientale d'une seconde espèce du groupe et elle appartient manifestement au genre dont la Carpiodes cyprinus est le type. Mais elle est remarquable parmi tous les poissons de la division des Ichthyobi (Carpiodes Raf., Cycleptus Raf., Ichthyobus Raf., et Bubalichthys Ag.) par son dos très-élevé et anguleux et par sa très-longue dorsale à plus de 50 rayons. C'est un espèce éminemment distincte qu'on ne pourrait confondre avec aucune des espèces américaines."—(BLEEKER, *Notices sur Quelques Genres et Espèces des Cyprinoïdes de Chine, <Nederlandisch Tijdschrift voor de Dierkunde*, 1864, ii, pp. 19–21.)

ADDENDA.

23. CHASMISTES LIORUS *Jordan, sp. nov.*

Big-mouthed Sucker of Utah Lake.

1878—*Chasmistes fecundus* JORDAN, Bull. Hayden's Geol. Surv. Terr. iv, No. 2, 417. (Not *Catostomus fecundus* Cope & Yarrow.)

Chasmistes fecundus JORDAN, p. 150 of the present work.

Since pages 149–151 of the present work were in press, I have carefully recompared Cope and Yarrow's description and figure of their *Catostomus fecundus*, and my notes on their typical specimens, with the specimens on which the genus *Chasmistes* was based, and I have come to the conclusion, hinted at in the text, that the *Chasmistes* is a species distinct from *C. fecundus*, and thus far undescribed. The specific name *liorus* (λεῖος, smooth; ὄρος, border) is therefore proposed for it, in allusion to the smooth lips.

28 (*b*). CATOSTOMUS FECUNDUS *Cope & Yarrow.*

Sucker of Utah Lake.

1876—*Catostomus fecundus* COPE & YARROW, Zool. Lieut. Wheeler's Expl. W. 100th Mer. 678, plate xxxii, figs. 1, 1 *a*.

Catostomus fecundus JORDAN & COPELAND, Check List, 156, 1·76. (Name only. Not *Catostomus fecundus* Jordan, Bull. U. S. Nat. Mus. xi; nor *Chasmistes fecundus* Jordan, Bull. Hayden's Geol. Surv. Terr. iv, No. 2, 417.)

HABITAT.—Utah Lake.

As stated above, I at first identified *Chasmistes liorus* from Utah Lake with this species from the same waters, the two being very similar as to scales and fins, and the form of the mouth and snout in the figure of *C. fecundus* suggesting, though not resembling, the form of those parts in *Chasmistes*. The finding of one of the typical specimens of *Catostomus fecundus* in the National Museum has shown me that it is a true *Catostomus*, and not a *Chasmistes*. I did not ascertain the lip characters of the species while at the Museum, the mouth-parts being in poor condition, and I therefore am not now able to place it in the ana-

lytical key to the species of the genus. If the upper lip is narrow, with few rows of tubercles, it will not be easy to separate *fecundus* from *teres*. If the lip is broad, with many series of tubercles, it will be approximated to *C. occidentalis*, differing, however, in the larger scales (about 60 in the lateral line, instead of 72). I therefore quote the original description, and leave the relations of the species to be finally settled at some future time:—

"It is a true *Catostomus* having the parietal fontanelle well marked and widely open. The head enters in entire length 5 times, the diameter of the orbit 6 times in greatest length of side of head. The insertion of the dorsal fin anteriorly is nearer to the end of the muzzle than insertion of caudal; the ventrals originating below middle of dorsal. The width of the dorsal to ventral enters the entire length to insertion of caudal 6 times.

"Radii: D. 12–13. A. 1–8. P. 7. V. 11. Scales are in 20 longitudinal rows from the insertion of the first dorsal to pectoral, and in 60 transverse rows from branchiæ to insertion of caudal: they are elongate and octagonal, smaller on dorsal region, and larger on ventral. Body elongated, subfusiform. It differs from *C.* (*Acomus*) *generosus*, Gir., in many particulars, as may be seen from the following comparisons.

"Girard's species has no fontanelle; is shorter and narrower; the diameter of orbit enters greatest length of side of head 5 times instead of 6. The anterior insertion of dorsal fin is equidistant between the end of the snout and the insertion of the caudal, while in *C. fecundus*, it is nearer the end of the snout than insertion of caudal. The ventrals in *C. generosus* originate under the posterior third of the dorsal; in *C. fecundus* under the middle third of the dorsal. The radii in *C. generosus* are: D. 10, A 2, 7, P. 16, V. 10, C. 27; in *C. fecundus:* D. 12–13, A. 1, 8, P. 17, V. 11.

"This species is abundant in Utah Lake, and is called 'Sucker' by the settlers. They run well up the rivers to spawn in June; feed on the bottom and *eat spawn* of better fish; spawning beds on gravel; bite at hook sometimes; are extremely numerous, and are considered a nuisance by the fishermen, but they meet with a ready sale in winter, at an average price of 2½ cents a pound."—(COPE & YARROW, *l. c.*)

Specimens in United States National Museum.

Number.	Locality.	Collector.
12894	Utah Lake	Yarrow & Henshaw.
—	do	Do.

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LACÉPÈDE (**Bernard Germain Étienne de la Ville-sur-Illon**, *Comte de*). Histoire Naturelle des Poissons par le Citoyen La Cépède, membre de l'Institut national, et Professeur du Muséum de histoire naturelle. Tome premier à cinquième. À Paris, chez Plassan, imprimeur libraire, Rue du Cimetière André-des-Arcs, No. 10. L'an VI de la République, — 1798 [— L'an XI de la République, i. e. 1803].

[Descriptions of Le Cyprin catostome, *Cyprinus catostomus* Forster, Le Cyprin commersonien, and Le Cyprin sucet, *Cyprinus sucetta* Lacépède.]

BLOCH (**Mark Elieser**) *and* **SCHNEIDER** (**Johann Gottlob**). M. E. Blochii Doctoris Medicinæ Berolinensis, et societatibus literariis multis adscripti, Systema Ichthyologiæ iconibus CX illustratum.—Post obitum auctoris opus inchoatum absolvit, correxit, interpolavit Jo. Gottlob Schneider, Saxo.-Berolini, sumtibus Auctoris impressum et bibliopolio Sanderiano commissum, 1801.

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[Originally printed in the Western Review and Miscellaneous Magazine, Lexington, Kentucky, 1819–20. It contains descriptions of the genera and species of *Catostomi* found in the Ohio River, they being referred to three genera, *Catostomus*, *Cycleptus*, and *Hypentelium*, the genus *Catostomus* being divided into five new subgenera, *Moxostoma*, *Ictiobus*, *Carpiodes*, *Teretulus*, *Erurystomus*, and *Decactylus*.

The following is the arrangement of the species described:—

Genus CATOSTOMUS.
- Subgenus *Moxostoma*.
  - anisurus, sp. nov.
  - anisopterus, sp. nov.
- Subgenus *Ictiobus*.
  - bubalus.
  - niger.
- Subgenus *Carpiodes*.
  - carpio, sp. nov.
  - velifer, sp. nov.
  - xanthopus, sp. nov.
- Subgenus *Teretulus*.
  - melanops, sp. nov.
  - melanotus, sp. nov.
  - fasciolaris, sp. nov.
  - erythrurus.
  - flexuosus, sp. nov.
- Subgenus *Erurystomus*.
  - megastomus, sp. nov.
- Subgenus *Decactylus*.
  - duquesni.

Genus CYCLEPTUS.
- nigrescens.

Genus HYPENTELIUM.
- macropterum.]

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——— Description of a new species of Catostomus. By Wm. O. Ayres, M. D. Feb. 26, 1855. <Proceedings of the California Academy of Sciences, vol. i, pp. 31–32, 1855; 2d ed., pp. 30–32, 1873.

[*Catostomus labiatus*, sp. nov.]

AGASSIZ (Louis). Synopsis of the Ichthyological Fauna of the Pacific Slope of North America, chiefly from the collections made by the U. S. Expl. Exped., under the command of Capt. C. Wilkes, with recent Additions and Comparisons with Eastern types; by L. Agassiz. <American Journal of Science and Arts, 2d series, vol. xix, 1855, pp. 186–231.

[Characterizes very fully the genera, viz:—*Carpiodes* Raf.; *Bubalichthys* Ag., gen. nov.; *Ichthyobus* Raf.; *Cycleptus* Raf.; *Moxostoma* Raf.; *Ptychostomus* Ag., gen. nov.; *Hylomyzon* Ag., gen. nov.; and *Catostomus* Le Sueur. The species of each genus are noticed, and the following new species are very briefly and in most cases unsatisfactorily described:—*Carpiodes thompsoni*, *Bubalichthys bonasus*, *Ichthyobus rauchii*, *Ichthyobus stollcyi*, *Moxostoma tenue*, and *Catostomus occidentalis*.]

GIRARD (Charles). Researches upon the Cyprinoid Fishes inhabiting the fresh waters of the United States of America, west of the Mississippi Valley, from specimens in the Museum of the Smithsonian Institution. By Charles Girard, M. D. <Proceedings of the Academy of Natural Sciences of Philadelphia, 1856, pp. 165–213.

[Twenty-six species enumerated—most of them briefly described. Two new genera are proposed, *Minomus* and *Acomus*, and the following new species are characterized:—*Carpiodes damalis*. *Moxostoma claviformis*, *Moxostoma kennerlii*, *Moxostoma victoriæ*, *Moxostoma campbelli*, *Ptychostomus albidus*, *Ptychostomus haydeni*, *Acomus guzmaniensis*, *Acomus generosus*, *Acomus griseus*, *Acomus lactarius*, *Catostomus macrochilus*, *Catostomus sucklii*, and *Catostomus bernardini*. These descriptions are mostly short and insufficient.]

——— General Report upon the Zoology of the Several Pacific Railroad Routes. =Reports of Explorations and Surveys to Ascertain the most practicable and Economical Route for a Railroad from the Mississippi River to the Pacific Ocean, made under the direction of the Secretary of War, in 1853–6, according to Acts of

GIRARD (Charles)—Continued.

Congress of March 3, 1853, May 31, 1854, and August 5, 1854. Volume X. Washington, A. O. P. Nicholson, Printer, 1859. (Part 4, Fishes, by Dr. Charles Girard.)

[Descriptions of *Carpiodes damalis*, *Moxostoma claviformis*, *Ptychostomus haydeni*, *Acomus generosus*, *Acomus griseus*, *Acomus lactarius*, *Catostomus occidentalis*, *Catostomus labiatus*, *Catostomus macrocheilus*, and *Catostomus sucklii*; all of the species except *Acomus generosus*, *C. occidentalis*, *C. labiatus*, and *C macrocheilus* being accompanied by figures.]

——— United States and Mexican Boundary Survey, under the order of Lieut. Col. W. H. Emory, Major First Cavalry and United States Commissioner.—Ichthyology of the Boundary, by Charles Girard, M. D. < United States and Mexican Boundary Survey, vol. ii, part i, 1859.

[Descriptions and figures of *Ictiobus tumidus*, *Moxostoma kennerlii*, *Moxostoma victoriæ*, *Moxostoma campbelli*, *Ptychostomus congestus*, *Ptychostomus albidus*, *Minomus insignis*, *Minomus plebeius*, *Minomus clarki*, *Acomus latipinnis*, *Acomus guzmaniensis*, and *Catostomus bernardini*.]

BLEEKER (Pieter van). "Conspectus systematis Cyprinorum. < Naturl. Tijdschr. Nederl. Ind. XXI, 1860."

[Systematic arrangement of the genera.]

ABBOTT (Charles Conrad). Descriptions of Four New Species of North American Cyprinidæ, by Charles C. Abbott. < Proceedings of the Academy of Natural Sciences of Philadelphia, 1860, pp. 473–474.

[Describes *Catostomus texanus* and *Catostomus chloropteron*.]

GILL (Theodore Nicholas). On the classification of the EVENTOGNATHI or CYPRINI, a suborder of TELEOCEPHALI, by Theodore Gill. <Proceedings of the Academy of Natural Sciences of Philadelphia, 1861, pp. 6–9.

[Characterizes the suborder *Eventognathi*, equivalent to "the true Cyprinoids of Agassiz, without teeth in the jaws, and with large falciform lower pharyngeal bones". This suborder is divided into four families,—*Homalopteroidæ*, *Cobitoidæ*, *Cyprinoidæ*, and *Catastomoidæ*; the latter family being in turn divided into three subfamilies,—*Catastominæ*, *Cycleptinæ*, and *Bubalichthyinæ*.]

PUTNAM (Frederick Ward). List of the Fishes sent by the Museum to different Institutions, in exchange for other Specimens, with Annotations. By F. W. Putnam. =Bulletin of the Museum of Comparative Zoology, Cambridge, Massachusetts, U. S. A., 1863, (No. 1).

[Contains names of 10 species, with references to descriptions by Professor Agassiz.]

COPE (Edward Drinker). Partial Catalogue of the Cold-blooded Vertebrata of Michigan. Part 1. By Prof. E. D. Cope.

[Notes on several species.]

GILL (Theodore Nicholas). Synopsis of the Fishes of the Gulf of St. Lawrence and the Bay of Fundy. By Prof. Theodore Gill, M. A. < Canadian Naturalist, August, 1865, (pp. 1–24 in reprint).

[Records *Catastomus bostoniensis* and *Moxostoma oblongum*.]

BLEEKER (Pieter van). Notices sur Quelques Genres et Espèces des Cyprinoïdes de Chine par P. Bleeker. < Nederlandsch Tijdschrift voor de Dierkunde, uitgegeven door het Koninklijk Zoologisch Genootschap, Natura Artis Magistra, te Amsterdam, onder Redaktie van P. Bleeker, H. Schlegel en G. F. Westerman, tweede jaargang, 1865.

[Description of *Carpiodes asiaticus*, sp. nov.]

THOREAU (Henry David). A Week on the Concord and Merrimack Rivers, by Henry D. Thoreau, author of "Walden," etc. New and revised edition. Boston: Ticknor and Fields. 1868.

[Contains an account of the habits of *Catostomus bostoniensis* and *C. tuberculatus*.]

GÜNTHER (Albert). Catalogue of the Physostomi, containing the families Heteropygii, Cyprinidæ, Gonorhynchidæ, Hyodontidæ, Osteoglossidæ, Clupeidæ, Chirocentridæ, Alepocephalidæ, Notopteridæ, Halosauridæ, in the collection of the British Museum, by Dr. Albert Günther. London: Printed by order of the trustees. 1868. =Catalogue of the Fishes of the British Museum by Albert Günther, M. A., M. D., Ph. D., F. R. S., F. Z. S., etc., etc. Volume seventh.

[Contains descriptions of twenty-four species, besides twenty-one doubtful species merely enumerated, arranged in four genera, *Catostomus*, *Moxostoma*, *Sclerognathus*, and *Carpiodes*.]

COPE (Edward Drinker). On the Distribution of Fresh Water Fishes in the Alleghany Region of South-Western Virginia. By E. D. Cope, A. M. < Journal of the Academy of Natural Sciences of Philadelphia, new series, vol. vi, part iii, January, 1869, pp. 207–247.

[Description and figure of *Teretulus cervinus*, sp. nov., with notes on *T. duquesnei*, *Catostomus nigricans*, and *C. communis*.

GÜNTHER (Albert). An Account of the Fishes of the States of Central America based on Collections made by Capt. J. M. Dow, F. Godman, Esq., and O. Salvin, Esq. By Albert Günther, M. A., M. D., Ph. D., F. R. S., F. Z. S. < Transactions of the Zoological Society of London, vol. vi, 1869, pp. 377–494.

[Description of *Bubalichthys meridionalis*, sp. nov.]

COPE (Edward Drinker). Partial Synopsis of the Fishes of the Fresh Waters of North Carolina, by Edw. D. Cope, A. M. < Proceedings of the American Philosophical Society of Philadelphia, 1870, pp. 448–495.

[Descriptions of *Placopharynx carinatus* (gen. et sp. nov.), *Ptychostomus papillosus* (sp. nov.), *P. velatus* (sp. nov.), *P. collapsus* (sp. nov.), *P. pidiensis* (sp. nov.), *P. coregonus* (sp. nov.), *P. albus* (sp. nov.), *P. thalassinus* (sp. nov.), *P. robustus* (sp. nov.), *P. erythrurus*, *P. lachrymalis* (sp. nov.), *P. macrolepidotus*, *P. duquesnei*, *P. carpio*, *P. oneida*, *P. aureolus*, *P. sucurii*, *P. crassilabris* (sp. nov.), *P. breviceps* (sp. nov.), *P. conus* (sp. nov.), *P. cervinus*, *Carpiodes difformis* (sp. nov.), *C. cutisanserinus* (sp. nov.). *C. selene* (sp. nov.), *C. velifer*, *C. grayi* (sp. nov.), *C. thompsoni*, *C. bison*, *C. cyprinus*, and *C. nummifer* (sp. nov.), with notes on other species, and a very useful analysis of the species of *Ptychostomus* and *Carpiodes*.]

——— Report on the Reptiles and Fishes obtained by the Naturalists of the Expedition, by E. D. Cope, A. M. < Preliminary Report of the United States Geological Survey of Wyoming, and contiguous territories, (being a second annual report of progress,) conducted under the authority of the Secretary of the Interior by F. V. Hayden, United States Geologist. Washington: Government Printing Office. 1872.

[*Catostomus discobolus*, *Minomus delphinus*, *Minomus bardus*, and *Ptychostomus bucco*, sp. nov.]

——— On the Plagopterinæ and the Ichthyology of Utah. By Edward D. Cope, A. M. Read before the American Philosophical Society, March 20th, 1874. < Proceedings of the American Philosophical Society of Philadelphia, vol. 14, pp. 129–139, 1874.

[*Minomus platyrhynchus* and *Minomus jarrovii* described as new species.]

JORDAN (David Starr). Synopsis of the Genera of Fishes to be looked for in Indiana, by Prof. David S. Jordan, M. D. < Sixth Annual Report of the Geological Survey of Indiana, made during the year 1874, by E. T. Cox, State Geologist; assisted by Prof. John Collett, Prof. W. W. Borden, and Dr. G. M. Levette. Indianapolis. Sentinel Company, Printers. 1875. pp. 197–228.

[Nine genera characterized and one or two species mentioned under each.]

——— Concerning the Fishes of the Ichthyologia Ohiensis, by David S. Jordan, M. S., M. D. < Proceedings of the Buffalo Society of Natural History, 1876, pp. 91–97.

[Contains identifications of the species described by Rafinesque; a new genus, *Erimyzon*, being proposed for *Cyprinus oblongus* Mitchill.]

JORDAN (**David Starr**). Manual of the Vertebrates of the Northern United States, including the district east of the Mississippi River, and north of North Carolina and Tennessee, exclusive of marine species. By David Starr Jordan, M. S., M. D., Professor of Natural History in N. W. C. University and in Indiana State Medical College. Chicago: Jansen, McClurg & Company. 1876.

[Twenty-three species briefly described, and referred to nine genera.]

NELSON (**Edward W.**) A Partial Catalogue of the Fishes of Illinois, by E. W. Nelson. < Bulletin of the Illinois Museum of Natural History, i, 1876.

[Notes on 21 species; *Ichthyobus cyanellus* described as a new species, and the genus *Carpiodes* united to *Ichthyobus*.]

UHLER (**P. R.**) *and* **LUGGER** (**Otto**). List of Fishes of Maryland, by P. R. Uhler and Otto Lugger. < Report of the Commissioners of Fisheries of Maryland, pp. 67–176, (1876).

[Seven species described.]

COPE (**Edward Drinker**) *and* **YARROW** (**Henry C.**) Report upon the collections of Fishes made in portions of Nevada, Utah, California, Colorado, New Mexico and Arizona during the years 1871, 1872, 1873 and 1874, by Prof. E. D. Cope and Dr. H. C. Yarrow. = Chapter VI. < Report upon Geographical and Geological Explorations and Surveys West of the One Hundredth Meridian, in charge of First Lieut. Geo. M. Wheeler, Corps of Engineers, U. S. Army, under the direction of Brig. Gen. A. A. Humphreys, Chief of Engineers, U. S. Army, published by authority of Hon. Wm. W. Belknap, Secretary of War, in accordance with acts of Congress of June 23, 1874, and February 15, 1875. In six volumes. Accompanied by one topographical and one geological atlas. Vol. V.—Zoology. Washington: Government Printing Office. 1875. (Issued in 1876.)

[Contains descriptions of *Pantosteus* (gen. nov.), *Pantosteus platyrhynchus*, *Pantosteus jarrovii*, *Pantosteus virescens* (sp. nov.), *Catostomus insigne*, *Catostomus alticolum*, *Catostomus discobolum*, *Catostomus fecundum* (sp. nov.), *Catostomus guzmaniense*, *Moxostoma insignatum* (sp. nov.), *Ptychostomus congestus*, and *Carpiodes grayi*, with figures of most of the species.]

JORDAN (**David Starr**) *and* **COPELAND** (**Herbert Edson**). Check List of the Fishes of the Fresh Waters of North America, by David S. Jordan, M. S., M. D., and Herbert E. Copeland, M. S. < Bulletin of the Buffalo Society of Natural History, ii, 1876, pp. 133–164.

[Eighty-three nominal species enumerated, referred to ten genera, viz:—*Catostomus*, *Pantosteus*, *Hypentelium*, *Erimyzon*, *Teretulus*, *Placopharynx*, *Carpiodes*, *Ichthyobus*, *Bubalichthys*, and *Cycleptus*.]

JORDAN (**David Starr**). On the Fishes of Northern Indiana. < Proceedings of the Academy of Natural Sciences of Philadelphia, 1877.

[Notes on several species; *Ichthyobus ischyrus* and *Bubalichthys altus* described as new species, from MSS. left with the author by Mr. Nelson; an analysis of the genera of *Catostomidæ* is given, nine of them being "accepted by Prof. Cope and the writer"]

——— A Partial Synopsis of the Fishes of Upper Georgia, by David S. Jordan, M. D. < Annals of the New York Lyceum of Natural History, 1876. (Published in 1877.)

[Notes on numerous species, *Myxostoma euryops* being described as new.]

KLIPPART (**John H.**) First Annual Report of the Ohio State Fish Commission to the Governor of the State of Ohio, for the years 1875 and 1876. Columbus: Nevins & Myers, State Printers. 1877.

[Descriptions of *Catostomus teres*, *Teretulus oblongus*, *Placopharynx carinatus*, *Carpiodes difformis*, and *Carpiodes velifer*, with woodcuts of all but *P. carinatus* and *C. velifer*. The descriptions are by Charles H. Gilbert, mostly arranged from MSS. notes of D. S. Jordan; the notes on habits, etc., by Mr. J. H. Klippart.]

JORDAN (David Starr) *and* **BRAYTON** (Alembert Winthrop). On Lagochila, a new genus of Catostomoid fishes. < Proceedings of the Academy of Natural Sciences of Philadelphia, 1877, pp. 280–283.

[Description and figure of *Lagochila lacera* (gen. et sp. nov.), with an analysis of the genera of *Catostomidæ* admitted, viz:—*Lagochila*, *Placopharynx*, *Myxostoma*, *Erimyzon*, *Hypentelium*, *Catostomus*, *Pantosteus*, *Cycleptus*, *Carpiodes*, *Ichthyobus*, *Bubalichthys*, and *Myxocyprinus*.]

HALLOCK (Charles). The Sportsman's Gazetteer and General Guide. The Game Animals, Birds and Fishes of North America: their Habits and Various Methods of Capture. Copious Instructions in Shooting, Fishing, Taxidermy, Woodcraft, etc. Together with a Directory to the Principal Game Resorts of the Country: illustrated with maps. By Charles Hallock, Editor of "Forest and Stream", Author of the "Fishing Tourist", "Camp Life in Florida", etc. New York: Forest and Stream Publishing Company. 1877.

[Contains descriptions and notices of numerous species; the Red Horse, *M. macrolepidotum*, being on p. 338 inadvertently called "*Catostomus cepedianum*".]

JORDAN (David Starr). Contributions to North American Ichthyology, based primarily on the Collections of the United States National Museum. I. Review of Rafinesque's Memoirs on North American Fishes, by David S. Jordan. Washington: Government Printing Office. 1877. = Bulletin of the United States National Museum, No. 9. pp. 53.

[Contains identifications of the various nominal species described by Rafinesque.]

——— Contributions to North American Ichthyology, based primarily on the Collections of the United States National Museum. II. A.—Notes on *Cottidæ*, *Etheostomatidæ*, *Percidæ*, *Centrarchidæ*, *Aphododeridæ*, *Dorysomatidæ*, and *Cyprinidæ*, with revisions of the genera and descriptions of new or little known species. B.—Synopsis of the *Siluridæ* of the fresh waters of North America. By David S. Jordan. Washington: Government Printing Office. 1877. =Bulletin of the United States National Museum, No. 10. pp. 116.

[Description of *Myxostoma pœcilura*, sp. nov.]

GILL (Theodore Nicholas). Johnson's New Universal Cyclopædia; a scientific and popular treasury of useful knowledge. Illustrated with maps, plans and engravings. Editors in chief, Frederick A. P. Barnard, S. T. D., LL. D., L. H. D., M. N. A. S., President of Columbia College, New York; Arnold Guyot, Ph. D., LL. D., M. N. A. S., Professor of Geology and Physical Geography, College of New Jersey. Associate Editors—[29 persons, among them Theodore Gill, A. M., M. D., Ph. D., M. N. A. S., Late Senior Assistant Librarian of the Library of Congress]. With numerous contributions from writers of distinguished eminence in every department of letters and science in the United States and in Europe. Complete in four volumes, including appendix. Volume IV, S—Appendix. (Testimonials at the end of the volume.) Alvin J. Johnson & Son, 11 Great Jones Street, New York. MDCCCLXXVIII.

[Contains a description of the family *Catastomidæ*, a list of the genera, and a diagnosis of *Myxocyprinus*, gen. nov.]

JORDAN (David Starr). Manual of the Vertebrates of the Northern United States, including the district East of the Mississippi River, and North of North Carolina and Tennessee, exclusive of Marine Species, by David Starr Jordan, Ph. D., M. D., Professor of Natural History in Butler University. Second Edition Revised and Enlarged. Chicago: Jansen, McClurg & Company. 1878.

[Descriptions of forty species, referred to eleven genera:—*Lagochila*, *Placopharynx*, *Myxostoma*, *Minytrema* (gen. nov.), *Erimyzon*, *Hypentelium*, *Catostomus*, *Cycleptus*, *Carpiodes*, *Ichthyobus*, and *Bubalichthys*. In the Addenda, the name *Quassilabia* is suggested as a substitute for *Lagochila*.]

JORDAN (David Starr). A Catalogue of the Fishes of the Fresh Waters of North America. By David S. Jordan, M. D. < Bulletin IV, Hayden's Geological Survey of the Territories, No. 2, pp. 407–442. Washington, May 3, 1878.

[Fifty-one species enumerated; arranged in thirteen genera, viz:—*Bubalichthys*, *Ichthyobus*, *Carpiodes*, *Cycleptus*, *Pantosteus*, *Catostomus*, *Chasmistes* (gen. nov.), *Erimyzon*, *Minytrema*, *Myxostoma*, *Placopharynx*, and *Quassilabia*.]

——— Notes on a Collection of Fishes from the Rio Grande, at Brownsville, Texas. By David S. Jordan, M. D. <Bulletin Hayden's United States Geological and Geographical Survey, vol. iv, No. 2. Washington, May 3, 1878.

[Synonymy and note on *Carpiodes tumidus*.]

——— A Catalogue of the Fishes of Illinois, by Prof. David S. Jordan. <Illinois State Laboratory of Natural History. The Natural History of Illinois. Bulletin No. 2. Bloomington, Ill., June, 1878.

[Twenty-three species enumerated, with notes; these are arranged in nine genera.]

FORBES (S. A.) The Food of Illinois Fishes by S. A. Forbes. <Bulletin of the Illinois State Laboratory of Natural History, No. 2, 1878.

[Valuable notes on the food of *Catostomidæ*.]

JORDAN (David Starr). Notes on a Collection of Fishes from the Rio Grande, at Brownsville, Texas, continued. By D. S. Jordan M. D. < Hayden's Bulletin of the Geological and Geographical Survey of the Territories, vol. iv, No. 3. Washington, July 23, 1878.

[Remarks on the probable identity of *Carpiodes grayi* and *Ictiobus tumidus* with *Carpiodes cyprinus*.]

——— Catalogue of the Fishes of Indiana, in Article Pisciculture (by Alexander Heron). <Twenty-seventh Annual Report of the Indiana State Board of Agriculture, 1877. Volume XIX. Indianapolis. 1878.

[Twenty-two species enumerated, referred to ten genera.]

JORDAN (David Starr) *and* **BRAYTON (Alembert Winthrop).** On the Distribution of the Fishes in the Alleghany Region of South Carolina, Georgia and Tennessee, with Descriptions of New or Little Known Species. By David S. Jordan and Alembert W. Brayton. <Bulletin of the United States National Museum, No. 12. Washington, Government Printing Office, 1878.

[Notes on numerous species.]

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THE FLORA

OF

ST. CROIX AND THE VIRGIN ISLANDS,

BY

BARON H. F. A. EGGERS.

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1879.

ADVERTISEMENT.

This work is the thirteenth of a series of papers intended to illustrate the collections of natural history and ethnology belonging to the United States, and constituting the National Museum, of which the Smithsonian Institution was placed in charge by the act of Congress of August 10, 1846.

It has been prepared at the request of the Institution, and printed by authority of the honorable Secretary of the Interior.

SPENCER F. BAIRD,
Secretary of the Smithsonian Institution.

SMITHSONIAN INSTITUTION,
Washington, May, 1879.

FLORA OF ST. CROIX AND THE VIRGIN ISLANDS, WEST INDIES.

By Baron H. F. A. Eggers.

To the east of the island of Porto Rico, between 18° 5′ and 18° 45′ N. lat. and 64° 5′ and 65° 35′ W. long., stretches a dense cluster of some larger and numerous smaller islands for a distance of about 85 miles, which are known by the name of the Virgin Islands. The principal islands are Vieques and Culebra, belonging to Spain, St. Thomas and St. Jan, belonging to Denmark, and Tortola, Virgin Gorda, and Anegada, belonging to England. The superficial area of the larger islands is only from 16 to 40 square miles, whilst the smaller ones are mostly uninhabited islets, or even rocks, some of which are nearly devoid of vegetation, the coast-line of them all being sinuous, and forming numerous small bays and creeks. The whole group is evidently a submarine prolongation of the mountains of Porto Rico, showing its tops and higher ridges above the level of the sea, the depth of which between the various islands and Porto Rico is only from 6 to 20 fathoms. The declivities to the north and the south of the ridge on the reverse are very steep, no bottom having been found 25 miles to the south in 2000 fathoms, and 80 miles to the north the Challenger Expedition found a depth of about 3850 fathoms, the greatest ever measured in the northern Atlantic Ocean.

The greatest height in the Archipelago is attained in its central part, St. Thomas reaching up to 1550′, Tortola even to 1780′, St. Jan and Virgin Gorda being a little lower, whilst the hills in Vieques and Culebra, to the west, are only 500′–600′ high, and Anegada, the northeasternmost, is, as its Spanish name, the inundated, implies, merely a low or half-submerged island, elevated but a few feet over the level of the sea. The central islands, therefore, present the appearance of a steep ridge, precipitously sloping to the north and the south, and cut up by numerous ravines, which during heavy rains are the beds of small torrents, but which generally are without running water, and which at their lower end widen into small level tracts on the sea-coast, often forming a lagoon on the sandy shore. Between these level tracts the coast is usually very

bold and rocky, forming abrupt promontories of considerable height and picturesque appearance, the hills and ridges on the other hand being more rounded and of a softer outline.

The whole group of islands, with the exception of Anegada, which is built up of a tertiary limestone of very recent and probably pliocene date, belongs to the cretaceous period,* showing as the principal rock a breccia of felsite and scoriaceous stones, the cementing part of which probably consists of decomposed hornblende, and having its cavities commonly filled with quartz or calcareous spar. Besides this principal rock, which is often found distinctly stratified, and which is called Bluebit by the inhabitants, who generally employ the stone for building materials, limestone, diorite, clay-slate, and other less frequent minerals also occur in the islands, forming, however, only a poor substratum for vegetation everywhere. For the product of the decomposed rock is generally a red heavy clay. Only Vieques shows a more fertile soil, produced by the alteration of a syenite-like diorite, its more level surface at the same time allowing the fertile strata to remain on the surface; whilst in the other islands the heavy rains as a rule will wash the loose covering of the ground down to the sea.

From various facts observed in Anegada and Virgin Gorda by Sir R. Schomburgk,† as well as by Mr. Scott, in Vieques, at Porto Ferro Bay, it appears that at the present period the whole chain of islands is slowly rising, so that perhaps in a geologically speaking not very distant time most of the islands may become connected reciprocally and with Porto Rico.

To the south of the Virgin Islands, at a distance of about 32 miles, and between 17° 40′ and 17° 47′ N. lat., 64° 35′ and 64° 54′ W. long., lies the island of St. Croix, geographically considered an outlying part of the former group, but separated from it by an immense chasm of more than 2000 fathoms, as stated above. This extraordinary crevice has no doubt been formed at an early period, and has in various respects contributed materially to isolating the island from its neighbours.

St. Croix is of about 57 square miles, and has a triangular form, with the greatest length, some 20 miles, from east to west, the greatest breadth being about 5 miles, in the western part of the island, which becomes gradually narrower towards the east. The coast-line is more connected and the surface more level than in most of the Virgin Islands, the hills stretching only along the northern coast and through the eastern part of

* Cleve: On the Geology of the North-eastern West India Islands. Stockholm, 1871.
† Berghaus: Almanach für das Jahr 1837, pp. 405 and 408.

the island, reaching in some places as high as 1150′ (Mount Eagle), but averaging 600′–800′ only.

The rock of these hills is nearly the same as in the above-named group, although the Bluebit of this latter occurs more rarely, and is substituted by a fine, greyish, stratified clay-slate, without vestiges of any organic remains. The strata of this slate are often very much disturbed, so as to present an exceedingly broken and overturned appearance. The greater, western part of the island forms a large, slightly inclined plain, sloping towards the south, and interrupted in a few places by low, short, isolated ridges only 200′–300′ high, and formed of a tertiary limestone of the miocene period. This limestone is covered by a layer of detritus and marls some feet thick, but shows itself at the surface in various places, and contains several fossils, partly of still existing species of mollusca.

Along the coasts are found some new alluvial formations, often enclosing lagoons, some of which are of considerable size. These lagoons are being gradually filled up by vegetable matter, as well as by sand and stones washed down by the rains from the hills; but whilst in the Virgin Islands many similar lagoons have been raised already several feet above the level of the sea, and laid completely dry, no such thing has been observed in St. Croix. This seems to indicate that no rising of the ground is taking place in the latter, as is the case in the former, as mentioned above. From its whole structure and formation it may be inferred that the soil is more fertile in St. Croix than in most of the Virgin Islands, Vieques excepted, the sugar-cane being cultivated to a considerable extent on the island.

Whilst thus the geology of St. Croix and the Virgin Islands presents some not unimportant differences, the climate may, on account of their similar geographical position, as well as elevation above the sea-level, be said to be materially the same in both.

In accordance with the geographical position of the islands, the temperature is very constant and high, the yearly mean average being 27.2° C., divided nearly equally over all the months, the coldest, February, showing 25.6°, the warmest, September, 28.9°, a difference of 3.3° only. The same uniformity is observed in the daily variation, which scarcely ever surpasses 5°, the thermometer rising gradually from 6 a. m. till 2 p. m., and falling just as gradually during the rest of the 24 hours.

Thus the difference of temperature at the various seasons of the year is too small to affect the life of vegetation to any very perceptible ex

tent, and it is therefore the variable degree of moisture at different times which chiefly produces any variation in the development of vegetable life at the different seasons.

The lowest temperature observed at the sea-level, in the shade, is 18.1°; the highest, 35.5°. In the sun, the mercury will sometimes rise as high as 51°, but as a rule does not surpass 40°. Observations made in St. Thomas by Knox* and myself show a decrease of about 2° for an elevation of every 800′, which gives to the highest ridges in St. Thomas and Tortola an annual mean temperature 3½°–4° lower than that of the coast, a difference sufficient to produce some variation in the flora of these parts. The northern slope of the hills, from being the greater part of the year, viz, from August to May, less exposed to the rays of the sun, are generally also somewhat cooler and more moist than the southern ones, the consequences whereof are also felt in the life of plants to a considerable extent.

An equal regularity, as observed in the temperature, manifests itself with regard to the pressure of the atmosphere, the daily variations of the barometer being only about 0.05″, and the maximum yearly difference only 0.2″. It is only during strong gales and hurricanes that the barometer is more seriously affected, it then falling sometimes as much as 2″. These hurricanes, as a rule, occur only during the months from August to October, at which period the trade-winds from the northeast, which otherwise blow most part of the year, generally become unsteady and uncertain. These constant winds, combined with the high temperature, no doubt are the reason why the moisture of the air is comparatively small, being on an average only 73 per cent. of the possible maximum, thus exciting a constant evaporation in plants, and rendering it necessary for them to obtain a greater supply of water through the soil than in more moist climates. For this reason a considerable quantity of rain becomes of the highest importance to the vegetable life, as being the only form in which plants can obtain a sufficient amount of water necessary to their existence, even dew being very rare on account of the trade-winds blowing also during the night the greater part of the year.

Neither of the islands in question is of sufficient elevation above the sea to cool and condense the atmospheric moisture brought on by the trade-wind, nor is their configuration favourable for detaining the clouds, their greatest extent being parallel to the direction of the wind. Thus, for the greater part of the year they receive only a small quantity of

*Knox: An Historical Account of St. Thomas, W. I. (New York, 1852.)

rain, falling chiefly in the form of short, rapid showers of only a few minutes' duration, and it is not till the warmer part of the year that heavy and general rains become possible in these regions. During this latter time, the trade-winds become irregular and slight, or are even entirely suspended, as stated before; hence the moisture generated by the daily evaporation from the ocean is not carried off as soon as formed, but is allowed to gather into rain-clouds, and finally to precipitate itself again as rain nearly on the same spot where it was formed.

From observations made in various islands for a period of more than twenty-five years, the annual mean quantity of rain seems to be about the same in all the islands, averaging 42″–44″; the eastern parts of all, as being more exposed to the direct action of the winds, always showing a considerably smaller quantity than the central and western ones.

Although no month of the year is without rain, yet from the above it will be easily concluded that there is a remarkable difference between the various months in this respect: the driest, February, having only an average of 1.5″; the wettest, October, of 7.0″; and to this difference, at the various periods of the year, it is chiefly due, that notwithstanding the uniform temperature all the year round, yet some variations in the aspect and intensity of vegetable life are observed in the various seasons.

Both the annual and the monthly quantity of rain are subject to vary considerably, one year showing 23″, or in some places 18″ only, another again 70″ or 78″. A still greater difference may be observed between the same months of different years: thus, February having had one year 0.19″ only, another, on the contrary, 3.75″; May 0.47″ the one year and 16.84″ the other. These excessive variations must, no doubt, materially affect vegetable life, indicating at the same time a considerable degree of hardiness in respect to drought in the perennial plants indigenous to the islands, and as alluded to above, acting upon them in a similar way as the variations in temperature in colder climates.

The number of days on which rain falls averages for the period from 1852–73, 161 a year, giving a mean fall of rain of 0.27″ per diem: April showing the lowest number, 9; October the highest, 16. From what has been said before, it is evident, however, that the small monthly quantity of rain during the dry part of the year, viz, January to April, divided even over a great number of days (so as to amount to 0.14″ or 0.18″ only a day), can be of no great importance, as it is precipitated in a short shower, is insufficient for penetrating into the soil, and so is very soon

evaporated again by the action of the sun and the trade-wind combined. It is not till May, when the increased quantity of rain is sufficient to penetrate the parched soil, that its influence and effect upon vegetation makes itself felt by renewed life and activity in all the various branches of the vegetable kingdom in general.

Looking at the vegetation of St. Croix and the Virgin Islands in its generality, and without entering into details, we may consider it to be identical, as a whole, showing the same main features, and naturally divided into four distinct formations, as in most other West India Islands, viz. the littoral, the shrubby, the sylvan, and the region of cultivation, connected, of course, here and there by intermediate formations, but on the whole virtually distinct from different biological conditions.

Beginning with the littoral flora, we find along the coast in shallow water a multitude of Algæ, among which are found some marine Phanerogamæ, especially the common *Thalassia testudinum* and *Cymodocea manatorum*, and in less quantity the beautiful little *Halophila Baillonii*, a recently discovered Potamea, with oval delicate leaves, and growing gregariously on the bottom of the sea in coarse gravel. The vegetation of tropical seashores is of a very uniform character all over the world, the physical conditions being similar on them all, and the migration from one shore to another being exceedingly facilitated by the sea as well as by birds, storms, and the action and intercourse of the inhabitants. Thus, the same species of littoral plants are found on nearly all the West India islands, many of them also inhabitants of far distant shores on the African and Asiatic continents,—belonging to the cosmopolitan and transoceanic species, a list of which was first prepared by Robert Brown, and afterwards augmented by A. DeCandolle, and which seem to possess an extraordinary faculty for migration. According to the different character of the coast, as sandy, rocky, or swampy, the vegetation on it also assumes a different aspect.

On the sandy shore, which is composed of a fine white gravel, consisting principally of innumerable pieces of broken shells and corals, and thus forming a thick layer of carbonate of lime, we see a luxurious flora of trees, shrubs, and minor plants, which all, on account of the underground water collecting from the hills above, generally have a green appearance all the year round, even when the hills of the interior present a withered aspect from want of rain. Among the trees growing here the most prominent are the *Hippomane Mancinella*, the *Cocco-*

loba uvifera, *Chrysobalanus Icaco*, and *Canella alba*, besides the *Cocos nucifera*, which is planted and naturalized, especially on the low sandy seashore. Under these taller forms appear many kinds of shrubs, such as *Ecastophyllum Brownei*, *Tournefortia gnaphalodes*, *Borrichia arborescens*, *Ernodea litoralis*, *Suriana maritima*, *Erithalis fruticosa*, *Colubrina ferruginosa*, *Guilandina Bonduc* and *Bonducella*, and several others. Still lower shrubs and suffrutescent herbs are *Scævola Plumieri*, *Tournefortia gnaphalodes*, *Sesuvium portulacastrum*, *Heliotropium curassavicum*, *Philoxerus vermiculatus*, *Cakile æqualis*, as well as several grasses and sedges, as *Sporobulus litoralis*, *Stenotaphrum americanum*, and *Cyperus brunneus*, as also some remarkable creepers or climbers, such as *Ipomœa pes-caprœ* and *Lablab vulgaris*.

Most of these species disappear on the rocky cliffs, where they give room for others, mostly shrubs of a low growth, and with thicker or more coriaceous leaves, that are able to resist the force of the wind, which often bends the whole plant into a dwarfish individual, the branches of which are cut off at the top in a western direction. The most common of these shrubs are *Jacquinia armillaris*, *Elœodendron xylocarpum*, *Plumieria alba*, and *Coccoloba punctata*, as well as some monocotyledonous plants, such as *Pitcairnia angustifolia*, *Agave americana*, and a few Cacti, principally the stout *Melocactus communis*.

Still more different forms appear where the coast becomes swampy from the presence of lagoons. Here predominates the Mangrove formation, composed chiefly of *Laguncularia racemosa*, *Conocarpus erectus*, *Avicennia nitida*, and *Rhizophora Mangle*, which all grow more or less in the water itself. In less moist places we find some others, such as *Bucida Buceras*, *Anona palustris*, *Antherylium Rohrii*, and the curious *Batis maritima*, which recalls to the mind the halophytes of the steppes.

However different these various forms of littoral plants may appear, compared to each other, yet they all have in common the predilection for the sea, the saline exhalation of which seems indispensable to their growth. Some have even, like *Avicennia*, their leaves always covered with small salt crystals; others, like *Batis maritima*, are true halophytes, and only very few of the plants of the coast in generality are found in the interior even of these small islands. An exception is made by the cocoanut palm, which is found growing all about on the islands, even on the top of the highest hills, as also by *Coccoloba uvifera*, found in similar localities.

In passing from the coast into the interior we find on the eastern, and

ADVERTISEMENT.

This work is the thirteenth of a series of papers intended to illustrate the collections of natural history and ethnology belonging to the United States, and constituting the National Museum, of which the Smithsonian Institution was placed in charge by the act of Congress of August 10, 1846.

It has been prepared at the request of the Institution, and printed by authority of the honorable Secretary of the Interior.

SPENCER F. BAIRD,
Secretary of the Smithsonian Institution.

SMITHSONIAN INSTITUTION,
Washington, May, 1879.

Interspersed between these evergreens are seen various species of arboreous plants with deciduous leaves, the number of which, however, seldom is large enough to seriously change the general aspect of the forest as being uniformly green all the year round. The time for shedding their foliage in these forms is generally from January to April, most of them, as stated before, flowering precociously at this time, as the moisture in the ground is not sufficient to allow them to retain their foliage together with the producing of the flowers. It appears evident that this is the reason for the shedding of the leaves, from the fact observed by me in several species (such as *Piscidia Erythrina* and others), that individuals which, from being too young or for some other reason, do not flower, do not shed their foliage, but evidently find moisture enough in the soil to resist the drought, not having to spend their resources on the production of flowers and fruits, as others of their kind.

The most prominent among the trees and shrubs with a deciduous foliage are *Spondias lutea*, *Schmidelia occidentalis*, the enormous *Eriodendron anfractuosum*, *Hura crepitans*, *Cascaria ramiflora*, *Sabinea florida*, and several others, which all more than the evergreens contribute their share to the forming of a layer of leaf-mould under the taller forms. Yet this layer is but scanty in most places, and from the want of it, as well as from the dense shade produced by the evergreen trees and shrubs, the minor forms covering the ground are comparatively scarce, and chiefly confined to some Piperaceæ, Acanthaceæ, and Gramineæ, as well as a few ferns and mosses, among which *Hemionitis palmata*, *Pteris pedata*, and *Asplenium pusillum* are the most common.

A somewhat richer variety is presented by the numerous epiphytes that cover the branches and stems of trees and shrubs, notwithstanding that the bark of the latter, from the uniform temperature, is, as a rule, exceedingly smooth, and but rarely covered with lichens or mosses. Of real parasites only a few are met with, especially *Loranthus emarginatus*, whilst the non-parasitical epiphytes are numerously represented by Bromeliaceæ (principally the genus Tillandsia), Aroideæ (among them the large-leaved *Philodendron giganteum*), and Orchidaceæ (chiefly Epidendrums and Oncidiums), as well as some ferns. Of these latter families, several species are found only on the highest ridges of the islands, at an elevation of over 1300′, there forming a formation peculiar to these regions, comprising, among others, some terrestrial Orchids, such as *Habenaria maculosa* and *alata*, as well as some Aroideæ, Bromeliaceæ, and ferns, among which the beautiful *Cyathea arborea* deserves special mention.

The part of the island inhabited and cultivated by man of course represents the least of interest in a phyto-geographical sense, as nature here has been modified and modelled according to the wishes and necessity of society to such an extent as to almost entirely obliterate its original character. As stated already, the principal object of cultivation is the sugar-cane, which, however, is cultivated on a large scale only in the two largest and most level of the islands, Vieques and St. Croix, the others, viz. St. Thomas, St. Jan, Tortola, and Virgin Gorda, having, with a few exceptions, long ago abandoned the cultivation of the cane as unremunerative, the two remaining of the larger islands, Culebra and Anegada, never having been appropriated to that purpose.

Besides the cane, some *Sorghum vulgare* is also cultivated in fields for herbage, the rest of the tilled soil being used for the planting of the common tropical vegetables, generally in small quantities, on patches of soil selected here and there. The commonest of these plants are Yam (*Dioscorea alata* and *altissima*), Sweet Potato (*Ipomœa Batatas*), Okro (*Abelmoschus esculentus*), Tanier (*Xanthosoma sagittæfolium*), Pigeon-pea (*Cytisus Cajan*), Tomato, and Pepper (*Capsicum*), as well as some Cucurbitaceæ, as Pumpkin, Melon, and others.

Along with these useful plants follow a great number of herbaceous annuals, mostly cosmopolitan weeds, introduced after the settlement of the islands, and dependent on the continuous cultivation of the land, as without the clearing of the soil from shrubs and trees their existence would soon be terminated by the stronger arboreous species, which would deprive them of the necessary light and air.

Thus, much against his wish, man favours the propagation of innumerable weeds, which in their short period of vegetation produce seeds enough to secure their continuance on the land notwithstanding the efforts to exterminate them by frequent weeding. Among the commonest of these forms are some Labiatæ (*Leonurus sibiricus*, *Leonotis nepetæfolia*, and *Leucas martinicensis*), *Argemone mexicana*, *Tribulus maximus*, *Boerhaavia erecta* and *paniculata*, and especially many grasses and sedges, such as Panicum, Paspalum, Chloris, Digitaria, Cyperus, and others. The most troublesome of these, from an agricultural point of view, is the Bay-grass (*Cynodon Dactylon*), said to be introduced, but now found everywhere, and, on account of its long creeping rhizoma, inexterminable.

Similar forms to these are seen growing along roads and ditches, especially some Leguminosæ, as Crotalaria, Desmodium, Phaseolus, Clitoria,

Centrosema, Teramnus, Vigna, Rhynchosia, and others; grasses, as Lappago, Aristida, Sporobolus, Eleusine, Dactyloctenium, and Eragrostis; or Synantherеæ, as Elephantopus, Distreptus, Bidens, and Pectis. Whilst all these latter forms flower during the greater part of the year, the beautiful Convolvulaceæ, such as *Ipomœa fastigiata*, *Nil*, *umbellata*, *dissecta*, *violacea*, and others, are in blossom only during the winter months, from December to February.

In some places that are moist enough, sedges and semi-aquatic plants will be seen growing; in a few rivulets which contain water all the year round, and which are limited to Vieques and St. Croix, a few aquatic forms occur, such as *Echinodorus cordifolius*, *Lemna minor*, *Typha angustifolia*, and *Nymphæa ampla*.

The pastures, which occupy a considerable extent of the land, are either artificial,—planted with Guinea-grass (*Panicum maximum*), a perennial plant, and, like most of the cultivated West India plants, introduced from the Old World,—or natural, covered with various forms of indigenous Gramineæ as well as low shrubs and trees, that have continually to be cleared away to prevent the land becoming overrun by them. The artificial pastures as a rule are fenced in, and often protected against the dry season by the planting of Thibet-trees (*Acacia Lebbek*), now commonly naturalized everywhere; the natural ones, on the contrary, are generally open and abandoned to the cattle, whilst the artificial ones are cut regularly, and the stock is not allowed to enter them.

The grasses composing the natural pastures are several species of Panicum, Paspalum, Dactyloctenium, and Sporobolus; some, as *Tricholæna insularis*, being very bitter and unfit for herbage. The roaming about of the cattle everywhere effectually prevents the re-establishment of trees or woods, which, for climatic reasons, would be desirable in many places; for the young buds are destroyed by sheep and goats, which no doubt have contributed largely to deteriorating even the still existing woods.

Around dwellings are found planted and naturalized most of the plants now common to nearly all tropical countries,—some fruit-bearing, as *Tamarindus indica*, *Mangifera indica*, *Carica Papaga*, *Persea gratissima*, *Crescentia Cujete*, *Melicocca bijuga*; others ornamental, as *Poinciana regia*, *Calliandra saman*, *Cæsalpinia pulcherrima*, and others Actual gardens are now very rare, flowers being mostly cultivated in pots or boxes. Some few vegetables of colder climates are cultivated in shady places where water is abundant, such as salad, radishes, cabbage, and others.

In waste places are found most of the tropical weeds, as *Ricinus com-*

munis, *Datura Metel* and *Stramonium*, *Euphorbia pilulifera*, *heterophylla*, and *hypericifolia*, *Mirabilis jalapa*, *Jatropha curcas*, *Cassia occidentalis*, and especially several kinds of Sida and Abutilon as well as some other Malvaceæ.

The four formations mentioned above are usually found only on the larger islands, the smaller ones, from their limited size, generally possessing chiefly the littoral and shrubby only. The island of Anegada, although being one of the larger ones, yet from its structure and the nature of its soil, seems to be chiefly covered by a vegetation composed of the plants of the sandy shore, besides some of the trees and shrubs following the settlement of man in these regions. Sir R. Schomburgk, who has given a description of the island in the Journal of the Royal Geographical Society, 1832, asserts that the island possesses several interesting species of plants, among others a peculiar kind of Croton. As, however, I have not been able to procure the work referred to above, I am not prepared to say which those species are, and they are not mentioned by Prof. Grisebach in his Flora of the British West India Islands.

Although, as stated above, the general character of the flora both in St. Croix and the Virgin Islands, considered as a whole, is essentially the same and distinctly West Indian, yet, in looking more closely into details, we are soon struck by finding a great many species in the one which are not found in the other. This is the more remarkable, as from a geographical and climatical point of view the physical conditions must be said to be materially identical.

In referring to the list of plants given at the end of my treatise it will be seen that out of a number of 881 indigenous phanerogamous species no less than 215, or c. $\frac{1}{4}$, are found in the Virgin Islands only, whilst 98, or about $\frac{1}{9}$, occur only in St. Croix, thus leaving only 568, or less than $\frac{2}{3}$, in common to both.

As may be expected from the general character of littoral vegetation, there are very few species which are not found on both sides of the deep channel separating St. Croix from its northern neighbours, the principal exception being *Baccharis dioica*, which only occurs in St. Croix, and *Egletes Domingensis*, found by me only in the Virgin Islands.

Some greater difference is found in the dry shrubby formation, where several very common plants, such as *Euphorbia petiolaris*, *Acacia sarmentosa*, *Mamillaria nivosa*, and others, are to be seen in the Virgin Islands only, St. Croix having to itself a few less common species, such as *Securinega acidothamnus* and *Castela erecta*.

It is, however, in the forest vegetation, which best represents the original flora of the islands, that the greatest and most varied differences are observed, showing especially the great variety of species in the Virgin Islands which are not all found in St. Croix, and among which are many of the commonest and most generally distributed forms. Belonging to St. Croix alone are comparatively few and rare species, chiefly some Rhamnaceæ, viz, *Maytenus elæodendroides* and *Zizyphus reticulatus*, *Catesbæa parviflora*, *Beloperone nemorosa*, *Petitia Domingensis*, *Buxus Vahlii*, and *Urera elata*. All these forms occur only in a few localities, and are of no importance to the general character of vegetation, as is the case on the Virgin Islands with many of the following species that are found on them, but not in St. Croix. It would be too much to mention all the different species here, for which I beg to refer to the appended list and tabular statement. I shall only enumerate a few of the most interesting, especially Malpighiaceæ (as *Byrsonima lucida*, *Malpighia Cnida* and *angustifolia*), Rutaceæ (*Pilocarpus racemosus*, *Tobinia spinosa*, *Xanthoxylum ochroxylum*), Leguminosæ (*Sabinea florida*, *Pictetia aristata*, *Sesbania sericea*, and *Acacia nudiflora*), and Sapotaceæ (*Sapota Sideroxylon*). Among Monocotyledones are to be mentioned *Arthrostylidium capillifolium*, *Rhynchospora pusilla*, *Dioscorea pilosiuscula*, *Catopsis nutans*, and several Orchids. Several of these plants grow more or less gregariously, thus becoming characteristical to the formation. Among these are *Malpighia Cnida*, *Reynosia latifolia*, *Acacia nudiflora*, *Sabinea florida*, and several species of Pilea, most of them being very common, and even generally used for domestic purposes.

Besides these species, entirely wanting in St. Croix, the Virgin Islands possess several that are very common, or at least not uncommon on them, but which occur but very rarely in St. Croix, such as *Thrinax argentea*, *Rondeletia pilosa*, *Faramea odoratissima*, *Miconia angustifolia*, *Mimosa Ceratonia*, and others, and most of which I have not found myself in the latter island, but only found labelled with St. Croix as habitat in the Copenhagen herbarium, so that an error in some cases at least may be not at all impossible.

However great are the differences in the flora on the two groups of islands, yet this interesting fact is not due to their possessing endemic species, as all the plants known as growing on them are also found in other West India islands, especially Porto Rico, whence the vegetation of both the Virgin Islands and St. Croix seems to be derived. Thus it

is mainly to different periods of immigration under varied physical conditions that we must ascribe the remarkable discrepancies in the flora of those apparently homogeneous islands. Some few species, it is true, are indeed given in my list as having been found only in the Virgin Islands, such as a few Cacteæ, *Vernonia Thomæ*, and the new species described by me on the present occasion. But as long as Porto Rico, Hayti, and even Cuba, are still insufficiently explored, it may very well remain doubtful whether those species do not also occur in one or several of them, just as several Cuban plants, described as endemical in that island by Prof. Grisebach, have been found by me to occur not at all unfrequently in the Virgin Islands and St. Croix, such as *Arthrostylidium capillifolium*, *Reynosia latifolia*, and *R. mucronata*.

It may thus be confidently asserted that both the groups in question have derived their stock of plants from the neighbouring larger island of Porto Rico. The question that remains to be solved is merely why have they not all received the same species, and particularly why is it that St. Croix, although the largest of all, has received a comparatively and absolutely much less number of species than for instance the far smaller St. Thomas?

For the explanation of these interesting facts we have no doubt to look to the geological history of the islands, as the conditions for immigration over sea, even if possible to all the species, are essentially the same in both groups, and therefore give no solution of the problem in question.

I am thus led to think that at a former period all the West India islands have been connected mutually, and perhaps with a part of the American continent also, during which time the plants in common to all the islands, as well as to the West Indies and the continent, have expanded themselves over their present geographical areas, at least as far as they are not possessed of particular faculties for emigration over the sea. By a subsequent volcanic revolution, St. Croix, as well as many of the other islands, has thereafter been separated from Porto Rico and the Virgin Islands, and put into its present isolated position, which it seems to have retained ever since, whilst the latter group of islands has either still for a long period remained in connection with Porto Rico, or, if separated at the same time from it as St. Croix, has, by another revolution, been again connected with the former.

The plants now found in the Virgin Group, but not occurring in St. Croix, would thus have immigrated into the former from Porto Rico

after the separation of St. Croix from the latter, and immigration would finally have ceased by the separation between them, as it exists at the present period. Thus, the plants found in the Virgin Islands, but not in St. Croix, would seem to have been more recently created in the probable centre of vegetation, Porto Rico, or some other of the larger Antilles; the endemic ones, as in the other islands also, being the youngest of all, not having been formed till after the complete separation between the islands had been effected. This latter suggestion, which perhaps seems contradictory to the general accepted theory of considering the endemic forms on oceanic isles as the remnants of the oldest original vegetation,* appears to be confirmed by the fact that even on such recent formations as the Bahamas, which have as yet been but imperfectly explored, already no less than eighteen endemic species have been discovered.†

The supposition that the islands may have been separated from the beginning, and have received their floras through immigration over the sea, is sufficiently confuted, partly by the great number of species common to them all, which clearly indicates the connection in former times with a larger country, partly by the circumstance that most of the species common to the islands are in no way better adapted for migration over the water than those peculiar to the Virgin Islands only; in fact, but few of them apparently possess the faculty of crossing salt-water even for a limited distance.

Supposing the theory of a prolonged or oftener repeated connection between Porto Rico and the Virgin Islands to be correct, it remains still to explain how St. Croix can have obtained a number of species which do not occur in the latter group. A few of these species, viz, *Castela erecta*, *Maytenus elæodendroïdes*, *Zizyphus reticulatus*, *Anthacanthus jamaicensis*, and *Buxus Vahlii*, occur in St. Croix on the tertiary limestone only, and seem thus to have avoided the Virgin Islands as not finding there the substratum suited to their organisation. The greater part, however, might, for all apparent reasons, as well occur in the Virgin group as in St. Croix, and their absence in the former cannot be explained in this way. It must, however, be understood that whilst my investigation of St. Croix has been thorough, and carried on for several years, my exploration of the Virgin Islands has been so for only a part of them, especially the Danish ones, my collections from the

* Hooker: On Insular Floras.

† Griseb.: Geogr. Verbr. der Pfl. Westindiens, p. 55.

others being only imperfect. Without expecting too much from this circumstance, yet I feel confident that not few of the St. Croix plants, apparently wanting in the Virgin group, may, by closer research, still be discovered growing there on some of them, whilst, on the other hand, I am equally confident that none, or scarcely any, of the Virgin Islands' species wanting in St. Croix will be found in the latter island.

It may furthermore be observed that scarcely any of the St. Croix species which I have given as being absent from the Virgin group are common or widely distributed over the island, and so are not possessed of any great faculty for conquering ground in the struggle for existence, for which reason some of them may not have been able to gain admission on the much smaller surface of the Virgin Islands, or, having obtained a footing, they may have lost it again by the later immigration of other species, now peculiar to the group compared with St. Croix, many of which, as will be remembered, are gregarious, and gifted with great facility for expanding themselves.

A very few species form an exception as to the limited distribution in St. Croix, *Bacharis Vahlii*, *Cordia alba*, and *Ægiphila martinicensis*, occurring rather frequently in the island, but having as yet not been found at all in the Virgin group, although they occur in several others of the West India islands. I am not prepared to give a satisfactory explanation of this fact at the present moment; but such isolated exceptions will no doubt always be met with in the explanation of general phenomena, and most probably a more thorough investigation of vegetable biology will at a future day afford a satisfactory explanation of such apparently inconsistent facts.

In drawing the necessary consequences of the above stated theory for explaining the geographical distribution of vegetable species in St. Croix and the Virgin Islands, it would thus appear necessary to conclude, for instance, from the occurrence of *Sabinea florida* both in Porto Rico, the Virgin Islands, and Dominica, but not in St. Croix, that the first-named islands were still all connected, when the latter had already been separated from them and put into its present isolated position. A similar inference might be drawn from the distribution of *Malpighia Cnida*, whilst the occurrence of *Acacia nudiflora* would seem to prove a similar thing for Hayti, Porto Rico, and Antigua.

It can, therefore, scarcely be presumed, as done by Prof. Grisebach in his Geogr. Verbreitung der Pfl. Westindiens, that the distribution of species is regulated chiefly by geographical distances. A closer investigation of the flora of the various islands no doubt will confirm the

theory drawn from the facts observed in regard to the mutual relation between St. Croix and the Virgin Islands, that geological revolutions have been equally or perhaps even more powerfully influential in arranging the distribution of species than the greater or smaller distance, and the similarity of physical conditions.

A full knowledge of these interesting facts can, however, not be expected till a more thorough exploration of all the West India islands has taken place. Few of them are as yet tolerably well known, and it is therefore earnestly to be hoped that such an exploration of all the West Indies may soon be effected, the result of which will no doubt be of the highest importance both to botany and to all other branches of natural science.

It generally requires the accumulated study and knowledge of generations before the less palpable and more delicate, but often most important, facts in natural history can be explained: the West Indies have been comparatively well studied since the middle of the last century; and it would seem well now to follow up the work in order to complete a thorough investigation, which might be used as a basis for the explanation of similar facts observed in other and less well known parts of the world.

The flora of the Virgin Islands and St. Croix has been studied by several botanists, some of whom have published the results of their research, which has, however, among the former group, been chiefly confined to the Danish islands, the English and particularly the Spanish ones having as yet been only imperfectly explored.

Publications on the flora of these islands are given by West in his Description of St. Croix (Copenhagen, 1793); Schlechtendal, Florula Ins. St. Thomæ, in Linnæa, 1828–31 and 1834; and Eggers, Flora of St. Croix, in the Vidensk. Medd. fra Naturhist. Forening (Copenhagen, 1876) besides minor contributions in Vahl's Eclogæ Americanæ, Symbolæ Botanicæ, and Enumeratio Plantarum, Krebs in Naturh. Tidsskrift, 1847, on the flora of St. Thomas, De Candolle's Prodromus, and Grisebach's Flora of the British West India Islands. This latter work, no doubt from want of material, scarcely ever mentions the British Virgin Islands.

Collections of plants from the islands in question are found chiefly in the Museum of the Botanical Garden in Copenhagen, as well as scattered in other European herbaria, collected principally by v. Rohr, West, Dr. Ryan, Ledru, Riedlé, L'Herminier in the past century, by Benzon, Wahlmann, Ehrenberg, Dr. Ravn, Dr. Hornbeck, Duchassaing, Schomburgk, Plée, Wydler, Örsted, Krebs, and Eggers in the present.

The following list of plants from St. Croix and the Virgin Islands formed on my own collections and the publications or collections of other botanists, comprises 1013* species of phanerogamous and vascular cryptogamous plants, of which 881 are indigenous and 132 naturalized, those merely cultivated being added in brackets after each family.

In determining the species I have, besides consulting the more important general systematical works on botany, as much as possible followed Prof. Grisebach's standard work on the Flora of the British West India Islands, to which I therefore beg to refer when no other authority is given. Synonymes and references to other authors are given only where it was thought desirable to supplement the Flora of Grisebach in this respect.

To the specific names of plants I have added only such statements as are not given in Grisebach's work,—as local name, time for flowering, technical use, as well as descriptive remarks, where my own observation shows a difference from the description given in the flora mentioned above.

In referring to Schlechtendal, or the herbarium of the Copenhagen Museum, I have used the abbreviations Schl. and Hb. Havn.; in quoting West or Schlechtendal, their respective works on St. Croix and St. Thomas, mentioned above, are understood to be referred to.

Special localities for habitats are given only where a plant is rare, or at all events uncommon; otherwise the island alone is mentioned.

The expression, "All islands," is meant to imply that the species is found both in St. Croix and the Virgin group, without necessarily meaning to say that it occurs in every island of the latter.

In summing up the statistical results from my list of species, nearly the same conclusions with regard to the most numerous families are arrived at as those given in Prof. Grisebach's Geogr. Verbr. der Pflanzen Westindiens, p. 73, for the Caribbean Islands.

The proportion between Mono- and Dicotyledonous plants indigenous and naturalized is 1:5.8, in the indigenous ones alone 1:4.9, thus showing the plurality of the recently introduced plants to have been Dicotyledonous. The proportion mentioned in the plants indigenous to the islands is somewhat lower than stated by Grisebach, as cited above, to be the rule in the West Indies, where it is given as 1:4, indicating, no doubt, that the climate of St. Croix and the Virgin Islands is less moist than that of the West Indies in general.

* De Candolle (Geogr. Bot. p. 1274) gives to St. Thomas as the probable number of Phanerogama only 450; but my list shows about 900.

Table showing the distribution of the Indigenous Species of Phanerogamæ and Cryptogomæ Vasculares in St. Croix and the Virgin Islands.

	St. Croix only.	Virgin Islands only.	Common to both.	Total.
A.—Dicotyledones.				
Dilleniaceæ	.....	1	.....	1
Anonaceæ	1	1	5	7
Menispermaceæ	.....	1	1	2
Nymphæaceæ	.....	.....	1	1
Papaveraceæ	.....	.....	1	1
Cruciferæ	.....	.....	3	3
Capparidaceæ	.....	1	7	8
Bixaceæ	.....	1	5	6
Violaceæ	.....	.....	1	1
Polygalaceæ	.....	3	.....	3
Caryophyllaceæ	1	2	9	12
Malvaceæ	4	6	21	31
Bombaceæ	1	.....	2	3
Büttneriaceæ	1	.....	5	6
Tiliaceæ	1	.....	7	8
Ternströmiaceæ	.....	.....	1	1
Guttiferæ	.....	.....	3	3
Canellaceæ	.....	.....	1	1
Erythroxylaceæ	.....	.....	1	1
Malpighiaceæ	.....	3	7	10
Sapindaceæ	2	1	4	7
Meliaceæ	.....	.....	3	3
Oxalidaceæ	.....	.....	1	1
Zygophyllaceæ	1	.....	2	3
Rutaceæ	3	3	3	9
Olacaceæ	.....	.....	1	1
Ampelideæ	.....	.....	4	4
Celastraceæ	1	.....	5	6
Rhamnaceæ	2	1	4	7
Terebinthaceæ	1	1	5	7
Leguminosæ	7	18	50	75
Chrysobalanaceæ	.....	.....	1	1
Myrtaceæ	4	4	18	26
Melastomaceæ	.....	4	6	10
Lythrariaceæ	.....	.....	2	2
Onagraceæ	.....	.....	1	1
Rhizophoraceæ	.....	.....	1	1
Combretaceæ	.....	.....	3	3
Cucurbitaceæ	1	1	7	9
Papayaceæ	.....	.....	1	1
Passifloraceæ	2	1	5	8
Turneraceæ	.....	1	1	2
Cactaceæ	.....	4	8	12
Araliaceæ	.....	1	.....	1
Umbelliferæ	.....	1	.....	1
Loranthaceæ	1	.....	1	2
Rubiaceæ	4	8	22	34
Synantheræ	4	13	32	49
Lobeliaceæ	.....	.....	1	1
Goodenoviaceæ	.....	.....	1	1
Myrsinaceæ	.....	.....	2	2
Sapotaceæ	.....	2	9	11

Table showing the distribution of the Indigenous Species of Phanerogamæ and Cryptogamæ Vasculares in St. Croix and the Virgin Islands—Contiuued.

	St. Croix only.	Virgin Islands only.	Common to both.	Total.
Styracese	.....	1	.....	1
Ebenaceæ	.....	1	.....	1
Oleaceæ	.....	.....	2	2
Apocynaceæ	.....	2	9	11
Asclepiadaceæ	1	3	3	7
Convolvulaceæ	3	7	24	34
Hydroleaceæ	.....	.....	1	1
Boraginaceæ	3	4	17	24
Solanaceæ	1	8	12	21
Scrophulariaceæ	2	1	3	6
Bignoniaceæ	1	2	6	9
Acanthaceæ	3	2	10	15
Gesneriaceæ	.....	.....	1	1
Labiatæ	1	2	9	12
Verbenaceæ	5	2	13	20
Myoporaceæ	.....	.....	1	1
Plumbaginaceæ	.....	.....	1	1
Phytolaccaceæ	1	.....	4	5
Chenopodiaceæ	.....	.....	3	3
Amarantaceæ	.....	2	13	15
Nyctaginaceæ	1	.....	5	6
Polygonaceæ	4	1	3	8
Lauraceæ	2	3	4	9
Thymelæaceæ	.....	1	.....	1
Euphorbiaceæ	3	5	30	38
Urticaceæ	4	7	10	21
Aristolochiaceæ	1	.....	1	2
Begoniaceæ	.....	1	.....	1
Piperaceæ	2	3	7	12
B.—Monocotyledones.				
Alismaceæ	1	.....	.....	1
Hydrocharidaceæ	.....	.....	1	1
Potameæ	.....	3	2	5
Aroideæ	1	5	3	9
Typhaceæ	.....	.....	1	1
Palmæ	.....	.....	2	2
Commelynaceæ	.....	2	3	5
Graminaceæ	4	14	35	53
Cyperaceæ	5	15	13	33
Liliaceæ	1	.....	7	8
Smilaceæ	1	1	.....	2
Dioscoreaceæ	.....	3	.....	3
Bromeliaceæ	.....	3	5	8
Scitamineæ	.....	.....	1	1
Orchidaceæ	1	12	2	15
C.—Cryptogamæ vasculares.				
Lycopodiaceæ	.....	1	1	2
Filices	4	15	15	34
	98	215	568	881
Naturalized species	17	6	109	132
Total	115	221	677	1013

FLORA OF ST. CROIX AND THE VIRGIN ISLANDS, WEST INDIES.

I. PHANEROGAMÆ.

A. DICOTYLEDONES.

DILLENIACEÆ.

1. **Davilla rugosa**, Poir.

St. Thomas (Griseb. Fl. p. 3).

ANONACEÆ.

2. **Anona muricata**, L. (v. Soursop, Susakka).

Fl. Feb.–May. Leaves with a peculiar strong scent, used against fever and vermin. Fruit edible; pulp resembling curdled milk, acidulous. In forests and thickets, common.—All islands.

3. **A. laurifolia**, Dun. (v. Wild Soursop).

Fl. Feb.–May. Resembling the former species in the foliage, but leaves of a quite different smell. Not uncommon in forests.—St. Croix; St. Thomas.

4. **A. palustris**, L. (v. Monkey-apple, Bunya).

Fl. May–June. Fruit not edible; used as bait for fishes. Common in marshy soil.—All islands.

5. **A. squamosa**, L. (v. Sugar-apple).

Fl. April–June. Foliage partly deciduous in March and April. Fruit edible, sweet, soft. Common in thickets.—All islands.

6. **A. reticulata**, L. (v. Custard-apple).

Fl. April–May. Fruit edible. In woods, not uncommon; also planted near dwellings.—All islands.—The enlarged top of the connective in all species of Anona is siliceous. None of the species enumerated above contains narcotic principles, as is the case with *A. Cherimolia*, Mill., and others.

7. **Guatteria Ouregou**, Dun.

St. Thomas (Griseb. Fl. p. 7).

8. **Oxandra laurifolia**, Rich. (*Uvaria excelsa*, Vahl in Hb. Juss.).

St. Croix (Caledonia Gut, West, p. 292).

MENISPERMACEÆ.

9. Cocculus domingensis, DC.

Fl. June–Aug. Stem woody, as much as two inches in diameter. Inflorescences often 3 or 4 uniserial in the same axil. (See Delessert, Icones, t. 96.) In forests, not common.—St. Thomas (near St. Peter, 1000′).

10. Cissampelos Pareira, L. (v. Velvet-leaf). *α*) **Pareira** and *β*) **microcarpa**, DC.

Fl. Nov.–March. In forests and thickets, common.—All islands.

NYMPHÆACEÆ.

11. Nymphæa ampla, DC. (v. Water-lily). *β*) **parviflora.**

Fl. April–July. In rivulets.—St. Croix (Kingshill Gut); Vieques (Port Royal).

PAPAVERACEÆ.

12. Argemone mexicana, L. (v. Thistle).

Fl. the whole year. A very common weed in dry places.—All islands.

CRUCIFERÆ.

13. Nasturtium officinale, R. Br. (v. Water-cress).

Never seen flowering. Naturalized along rivulets.—St Croix; St. Thomas.

14. Sinapis brassicata, L. (v. Wild Mustard).

Fl. Jan.–June. Around dwellings and in waste places, not uncommon.—All islands.

15. Sinapis arvensis, L.

Fl. cleistogamous in February. Regular flowers later in the year. Naturalized; rare.—St. Croix (near Anguilla).

16. Lepidium virginicum, L.

Fl. the whole year. A common weed along roadsides and near dwellings.—All islands.

17. Cakile æqualis, L'Her.

Fl. Feb.–July. Rather common on sandy shores.—All islands.

[Cultivated species: *Brassica oleracea*, L. (v. Cabbage); *Lepidium sativum*, L. (v. Cress); and *Raphanus sativus*, L. (v. Radish).]

CAPPARIDACEÆ.

18. Cleome pentaphylla, L. (v. Massámbec).

Fl. the whole year. Flowers often polygamous. Leaves used as spinach. A common weed near dwellings and in waste places.—All islands.

19. C. pungens, W. (v. Wild Massámbee). *c*) and *β*) **Swartziana.**

Fl. the whole year. Common along roads and ditches.—All islands.

20. C. viscosa, L.

Fl. May–Dec. Naturalized here and there.—St. Croix; St. Thomas.

21. Moringa pterygosperma, G. (v. Horse-radish-tree).

Fl. the whole year. Root with a flavour of horse-radish. Naturalized and common near dwellings.—All islands.

22. Capparis amygdalina, Lam.

Fl. March–June. Leaves on young radical shoots linear in this and the two following species. Not uncommon in thickets.—All islands.

23. C. jamaicensis, Jacq. (v. Black Willie). *α*) **marginata** and *β*) **siliquosa.**

Fl. April–Aug. *α*) not uncommon; *β*) less common along the shore and in thickets.—All islands.

24. C. cynophallophora, L. (v. Linguan-tree). *α*) and *β*) **saligna.**

Fl. Feb.–Aug.—Glands 2–4, uniserial in the axils, exuding nectar when young before the time of flowering, and are to be considered as reduced branches or inflorescences.

25. C. verrucosa, Jacq.

Fl. April–May. A middle-sized tree. Not uncommon in forests on the Virgin Islands.

26. C. frondosa, Jacq. (v. Rat-bean).

Fl. Feb.–May. Seeds very poisonous. Common in forests.—All islands.

27. Morisonia americana, L. *α*) and *β*) **subpeltata**, Gris. in litt.

Fl. May–Oct. A considerable-sized tree. *α*) all islands; *β*) leaves subpeltate.—St. Croix (Spring Gut).

BIXACEÆ.

28. Bixa Orellana, L. (v. Roucou).

Fl. June–July. The red pigment of the fruit was generally used by the Caribs for anointing the whole body (Du Tertre). Naturalized in forests.—St. Croix (Crequis, Wills Bay); St. Thomas (Crown).

29. Trilix crucis, Griseb.

Fl. April–June. Stipules very variable. Petals always abortive in my specimens. A low tree or shrub. Uncommon in forests.—St. Croix (Wills Bay, Mt. Eagle); St. Thomas (Flag Hill); St. Jan (Cinnamon Bay).

30. Casearia sylvestris, Sw.

Fl. Jan.–Feb. and May–July. Seed covered by a red arillus. Common in forests and thickets.—All islands.

31. C. parvifolia, W. *α*) and *β*) **microcarpa**, Egg.

Fl. March–July. Flowers odorous. Stamens alternately of equal length. Not uncommon in forests. A low tree.—*α*) Virgin Islands; *β*) fruit small, 2‴ diam., St. Croix.

32. C. ramiflora, Vahl. *c*).

Fl. Jan.–Feb. and July–Aug. Pedicel articulate below the middle. Arillus fibrous. Common in forests.—All islands.

33. Samyda glabrata, Sw.

Fl. June. Rare, in thickets on highest hill-tops.—St. Thomas (Crown, 1400′).

34. S. serrulata, L.

Fl. Feb.–May. Flowers odorous, precocious. Pedicels articulated at the middle. Leaves of young radical shoots linear. Common in thickets.—All islands.

VIOLACEÆ.

35. Ionidium strictum, Vent.

Fl. all the year round. Flower matutine. Rather uncommon in fissures of rocks in thickets.—St. Croix; Water Island.

TAMARICACEÆ.

36. Tamarix indica, Willd. (v. Cypress).

Fl. Sept.–Oct. Naturalized in gardens.—St. Croix; St. Thomas.

POLYGALACEÆ.

37. Polygala angustifolia, HB. Kth.

Fl. Dec.–Feb. In the shade of dense thickets. Rare.—St. Thomas (Cowell's Hill).

38. Securidaca Brownei, Gr. (*S. scandens* of West).

Fl. Feb.–April. Naturalized around Christiansted, v. Rohr.—St. Croix.

39. S. erecta, L.

St. Thomas (DC. Prodr. i, 341; Gris. Fl. p. 30).

40. Krameria Ixina, L.

Fl. July. The three narrow petals, resembling abortive stamens, are bent forward and cover the anthers. The two lateral ones are fleshy,

and covered on the outer side with fleshy papillæ. Fruit 1-seeded by abortion. Gregarious along roadsides in dry localities, but uncommon.—St. Thomas (Bovoni).

CARYOPHYLLACEÆ.

I. PARONYCHIACEÆ.

41. Drymaria cordata, W. β) **diandra.**

Fl. May–June. In moist localities in the shade. Rare.—St. Croix (Spring Garden).

42. Cypselea humifusa, Turp.

Fl. July. Gregarious around a small fresh-water lagoon. Rare.—Water Island.

II. MOLLUGINEÆ.

43. Mollugo verticillata, L.

Fl. Aug. Leaves often fleshy. On rocky shores. Rare.—Buck Island, near St. Thomas.

44. M. nudicaulis, Lam.

Fl. Sept.–Dec. Not uncommon in moist localities.—St. Croix; Buck Island near St. Croix; St. Thomas.

III. PORTULACEÆ.

45. Talinum triangulare, W.

Fl. all the year round. Flower open till 11 A. M. Sepals of unequal size. The large one 1-ribbed, the smaller one 3-ribbed. Petals often yellow (as represented in Jacq. Stirp. Americ. t. 135). Rather uncommon. On rocks near the seashore.—St. Croix; St. Thomas.

46. T. patens, W.

Fl. all the year round. Flower open from 3 P. M. till sunset. Petals pale red or yellow (Bot. Mag. t. 1543). Root tuberous. Here and there in rocky situations.—St. Croix; St. Thomas.

47. Portulaca oleracea, L. (v. Purslane). α) **macrantha**, β) **micrantha**, Egg.

Fl. the whole year. Flower open till 10 A. M. α) brownish, 5 petals, as many as 25 stamens, corolla 6‴ diam. β) green, 4 petals, 10–12 stamens, corolla 3‴ diam. Both varieties common along roadsides and in open spots.—All islands.

48. P. quadrifida, L. (Mant. 78).

Fl. all the year round. Petals 4, yellow, 2‴ long. Flower open from 11 A. M. till 3 P. M. Leaves opposite, clasping together towards evening. A common weed in gardens and along roads.—All islands.

49. P. pilosa, L.

Fl. all the year round. Often nearly glabrous. Roots tuberous. Petals red or yellow, large. Corolla up to 16‴ diam., open only till 9 a. m. Seeds dark brown. Leaves adpressing themselves downward to the stem towards evening. Not uncommon. Along ditches and in grass-fields.—St. Croix; St. Thomas.

50. P. halimoides, L.

Fl. June–Dec. Common along roadsides and among rocks.—St. Croix; St. Thomas.

51. Sesuvium portulacastrum, L. (v. Bay-flower).

Fl. all the year round. Sepals rosy inside. Common on sandy shores.—All islands.

52. Trianthema monogynum, L.

Fl. all the year round. Branches always originating in the axil of the smaller leaf. Stamens 7–17. Sepals and stamens rosy or white. Common on rocky shores.—St. Croix; St. Thomas.

MALVACEÆ.

53. Malvastrum spicatum, Gris. (v. Hollow-stock).

Fl. all the year round. Flower expanding in the afternoon. Very variable. A common weed along roads and in fields.—All islands.

54. M. tricuspidatum, Asa Gray.

Fl. all the year round. Common along roads and ditches.—All islands.

55. Sida carpinifolia, L. *α*) and *β*) **brevicuspidata.**

Fl. Sept.–March. Pedicel geniculate at the base, or as often not so. Petals imbricate dextrorsely or sinistrorsely. Both forms very common weeds everywhere in dry localities.—All islands.

56. S. glomerata, Cav.

Fl. Aug.–Oct.—Buck Island near St. Thomas; Vieques.

57. S. ciliaris, L.

Fl. Sept.–March. Flower expanded till 10 A. M. Stipules always longer than the petioles. Leaves closely clasping the stem in the evening. Gregarious on roads and near ditches. Common.—All islands.

58. Sida jamaicensis, L.

Fl. Dec.–March. Flower expanded till 9 A. M. Calyx shorter than the corolla. In grass-fields and thickets. Often suffrutescent, 6′ high. Common.—All islands.

59. S. spinosa, L. *α*), *β*) **angustifolia**, Lam., and *γ*) **polycarpa**, Egg.

Fl. Sept.–March. *γ*) suffrutescent, 4′ high. Pedicel as long as the whole leaf. Pistils, ovaries, and carpids always 12. *α*) and *β*) common in grass-fields and pastures. *γ*) near rivulets.—All islands.

60. S. rhombifolia, L. (v. Swart Marún). *γ*) **retusa**.

Fl. Dec.–March. Petals showing a purple blot at the base. Common in waste places.—All islands.

61. S. tristis, Schlecht. (Linnæa, iii, 271).

St. Thomas (Schl.).

62. S. supina, L'Her. *α*) **glabra** and *β*) **pilosa**, Egg.

Fl. Nov.–March. Two very distinct forms: *α*) in shady, moist places; *β*) in dry localities. Not uncommon in thickets and forests.—All islands.

63. S. arguta, Cav. (not *S. arguta*, Sw., as stated in Griseb. Syst. Unters. p. 31)

St. Croix (West, 297); St. Thomas (Schl.).

64. S. nervosa, DC. *α*) and *β*) **viscosa**, Egg.

Fl. Dec.–April. *β*) viscous and glandular pilose. Petals reddish; pistils red. Not uncommon along roads and ditches.—All islands.

65. S. acuminata, DC. *α*) **macrophylla** and *β*) **microphylla**.

St. Thomas (Schl.). "In locis siccis."

66. S. cordifolia, L. *β*) **althæfolia**, Sw.

Fl. March. Here and there along roads.—St. Croix (West, 297); St. Jan (Bethania).

67. S. humilis, W. (?) Cav.

St. Thomas (Schl.). "In locis umbrosis."

68. Abutilon periplocifolium, G. Don. *α*) and *β*) **albicans**, carpids 3-ovulate.

Fl. all the year round. Seeds dimorphous. The two seeds in the superior cell glabrous, the one in the inferior silky. *α*) not uncommon along roads. *β*) uncommon.—St. Croix (*α* and *β*); St. Jan (*β*).

69. A. umbellatum, Sw.

Fl. Dec.–March. Seeds cordate, brown. Not very common in open, dry localities.—All islands.

70. A. indicum, G. Don (v. Mahoe). *α*) and *β*) **asiaticum.**

Fl. all the year round. Flower expanded after 3 P. M. only. Both forms common along roads and on waste places.—St. Croix; St. Thomas.

71. A. lignosum, Rich. (v. Marsh-mallow).

Fl. Nov.–May. Flower expanded during the afternoon only. Seeds irregularly triangular, verrucose, grey.—St. Croix.

72. Bastardia viscosa, Kth. *α*).

Fl. all the year round. Flower expanded during the afternoon only. Common along roads and in dry localities.—All islands.

73. Malachra capitata, L. *α*) and *β*) **alceifolia**, Jacq.

Fl. Dec.–March. Flower expanded only till 2 P. M. Along ditches and in moist places. *α*) rather common; *β*) less common.—All islands.

74. M. urens, Poit.

Fl. April. Petals yellow, puberulous externally. Seeds smooth, glabrous. Uncommon on waste places.—St. Thomas (western shore of the harbour).

75. Urena lobata, L. *α*) **americana.**

Fl. Nov.–June. Flower expanded till 10 A. M. In forests.—St. Croix (rare; Prosperity on the north coast); St. Thomas; St. Jan (not uncommon).

76. Pavonia spinifex, Cav.

Fl. Oct.–Dec. Rather common in thickets and forests.—All islands.

77. P. racemosa, Sw.

Fl. Oct. In marshy soil among Laguncularia and Conocarpus.—St. Croix (uncommon; Salt River).

78. Kosteletzkya pentasperma, Gr.

Fl. Aug. Flower expanded till 10 A. M. In marshy soil. Rare.—St. Thomas (Krumbay).

79. Abelmoschus esculentus. W. A. (v. Okro).

Fl. all the year round. Fruit used immature as a vegetable. Cultivated and naturalized near dwellings.—All islands.

80. Hibiscus clypeatus, L.

St. Croix (West, p. 298).

81. H. vitifolius, L.

Fl. Dec.–March. Along roads and in thickets.—St. Croix (naturalized in the eastern part of the island).

82. H. Sabdariffa, L. (v. Red Sorrel).

Fl. Oct.–Nov. Leaves used as a vegetable. Calyx at length fleshy, used for lemonade. Cultivated and naturalized here and there.—St. Croix; St. Thomas.

83. H. phœniceus, Jacq.

Fl. Sept.–March. Rather common in thickets, especially near dwellings.—St. Croix; St. Thomas.

84. H. brasiliensis, L.

St. Croix (West, p. 298)

85. Gossypium barbadense, L. (v. Cotton-tree). *α*) and *β*).

Fl. all the year round. Down stellate. Common in dry localities. Formerly cultivated.—All islands.

86. G. vitifolium, Lam.

Naturalized in St. Thomas (Schl.), perhaps from having been cultivated in former times.

87. Paritium tiliaceum, A. Juss. (v. Mahoe).

Fl. Oct.–March. Bark employed as rope. Along coasts, but rare.—St. Croix (West, p. 297); St. Thomas (Schl.); St. Jan (Fish Bay).

88. Thespesia populnea, Corr. (v. Otaheite Tree).

Fl. all the year round. Very easily propagated by cuttings. A shady tree with very hard wood. Naturalized and cultivated everywhere, especially in moist localities. All islands.

All Malvaceæ are protandrous.

[Cultivated species: *Althæa rosea*, L. (v. Hollyhock); *Hibiscus rosa-sinensis*, L. (v. Chinese rose); and *H. mutabilis*, L. (v. Changeable Hibiscus).]

BOMBACEÆ.

89. Adansonia digitata, L. (v. Guinea Tamarind).

Fl. June–July. Leaves deciduous in March–April. The acid pulp of the fruit used for lemonade. Naturalized in wooded valleys.—St. Croix (Prosperity; Crequis); St. Thomas.

90. Eriodendron anfractuosum, DC. (v. Silk-cotton-tree).

Fl. Feb.–April. Leaves deciduous March–April. Stem growing to immense size. Common in forests. All islands.

91. Myrodia turbinata, Sw.

St. Croix (Spring Garden, West, p. 298).

92. Helicteres jamaicensis, Jacq.

Fl. March–Aug. Spiral of carpids 2½. Common in thickets.—All islands.

BÜTTNERIACEÆ.

93. Guazuma ulmifolia, Lam. (v. Jackass Calalu).

Fl. April–June. Wood used for oars. Not uncommon in pastures.—St. Croix; St. Thomas.

94. Theobroma Cacao, L. (v. Cocoa-tree).

Fl. June. Naturalized in shady valleys.—St. Croix (Prosperity; Mount Stewart).

95. Ayenia pusilla, L.

Fl. all the year round. Flowers often transformed into a hollow monstrosity by the larva of a wasp. Fruit muricate. In thickets, common.—All islands.

96. Melochria pyramidata, L.

Fl. all the year round. Common in pastures.—St. Croix.

97. M. tomentosa, L. (v. Broom-wood).

Fl. All the year round. Calyx tomentose, greyish white. Tomentum interspersed with glandulous hairs. Used for brooms. Common in dry thickets.—All islands.

98. M. nodiflora, Sw.

Fl. Nov.–July. Common in pastures and along roads.—All islands.

99. Waltheria americana, L. (v. Marsh-mallow).

Fl. Oct.–May. Common in pastures.—All islands.

TILIACEÆ.

100. Triumfetta Lappula, L. (v. Bur-bush).

Fl. Nov.–April. Common in thickets.—All islands.

101. T. althæoides, Lam. (v. Mahoe).

Fl. Dec.–March. In forests, uncommon.—St. Croix; St. Thomas.

102. T. semitriloba, L. (v. Bur-bush).

Fl. Oct.–March. In thickets and along roads, common.—All islands.

103. T. rhomboidea, Jacq.

Fl. Dec.–April. Uncommon in thickets.—St. Croix (Spring-gut).

104. Corchorus acutangulus, Lam.

Fl. June–Nov. The lowest serratures of the leaves in my specimens often show one or two long setaceous bristles, as stated in DC. Prodr.

i, 505. Griseb. Fl. p. 97, does not mention them, as he does in *C. olitorius*, neither does the figure in Wight's Icones, iii, t. 739, show them in this species. From observations made by me on *C. acutangulus*, as well as on *C. hirtus*, such bristles on the lower serratures of the leaves are of no specific value in this genus, being a variable feature. In gardens and near dwellings, not uncommon.—St. Croix; St. Thomas.

105. C. siliquosus, L. (v. Papa-lolo).

Fl. Nov.–July. Leaves used as a vegetable (Calalu). Along roads and in pastures, common.—All islands.

106. C. hirtus, L.

Fl. June–Sept. Two lowest serratures of the leaves sometimes showing one or two setaceous bristles. In gardens and along roads, not uncommon.—St. Croix; St. Thomas.

107. C. hirsutus, L.

Fl. all the year round. Hairs of the stem scabrous. On sandy shores, common.—All islands.

TERNSTRÖMIACEÆ.

108. Ternströmia elliptica, Sw.

Fl. Feb.–April. The two bracts at the base of the persistent calyx are to be considered as such (Swartz, Flora Ind. Occ. p. 961; DC. Prodr. i, p. 523; and Hook. & Benth. Genera Plant. i, p. 182), and not as sepals (Griseb. Fl. p. 103) on account of their being deciduous, but the sepals not. The number of ovules in my specimens are about twenty in each cell. (Hook. and Benth. l. c. ascribe to the genus only two, rarely three to six, in each cell; Grisebach l. c. only two to four. In the Catal. Plant. Cub. p. 36, Griseb. mentions, however, a variety of *T. obovalis*, Rich., with ten to thirteen ovules in each cell.) Sepals rosy, flowers fragrant In forests on high hills, rare.—St. Croix (Maroon Hill, 900′); St. Jan (Bordeaux Hill, 1200′).

GUTTIFERÆ.

109. Clusia rosea, L. (v. Chigger-apple).

Fl. May–Sept. Aërial roots as much as 20′ long, supporting the young trees on rocks or other trees. In forests.—St. Croix (rare, Wills Bay); Virgin Islands (not uncommon).

110. C. alba, L. (v. Wild Mamey).

St. Croix (West, p. 312). Probably a mistake for the first named species.

111. Mammea americana, L. (v. Mamey).

Fl. Feb. and later in Aug. Fruit generally one-seeded, eatable. Common in forests and planted along roads.—All islands.

112. Calophyllum Calaba, Jacq. (v. Santa Maria).

Fl. May–July. In forests along rivulets.—St. Croix (common in the northern part of the island); St. Thomas (rare).

CANELLACEÆ.

113. Canella alba, Murr. (v. White-bark).

Fl. Jan.–April. Berry dark crimson. Leaves used in warm baths for rheumatism. On sandy shores and in forests.—All islands.

ERYTHROXYLACEÆ.

114. Erythroxylum ovatum, Cav. (v. Wild Cherry, Brisselet).

Fl. April–Sept. Precocious. Branches, as a rule, transformed into brachyblasts. Common in thickets.—All islands.

(*E. areolatum*, West, p. 286, and *E. brevipes*, Bertero in Schlecht. Florula, are, no doubt, mistakes for the species mentioned above.)

MALPIGHIACEÆ.

115. Byrsonima spicata, Rich.

Fl. July–Aug. In forests, rare.—St. Croix (Parasol Hill); St. Thomas (Signal Hill); St. Jan (Bordeaux).

116. B. lucida, Rich.

Fl. Oct.—St. Thomas (DC. Prodr. i, 580); Vieques (Campo Asilo).

117. Bunchosia Swartziana, Gris.

Fl. July. Pedicel uniglandular and bibracteolate at the joint. Very much attacked by insects. In thickets.—St. Croix (rare, Kingshill); St. Thomas (not uncommon); St. Jan.

118. Galphimia glauca, Cav. (Icon. v, p. 61) (*G. gracilis*, Bartl.).

Fl. all the year round. Naturalized in gardens.—All islands.

119. Malpighia glabra, L. (v. Cherry).

Fl. May–June. Fruit edible. Common in thickets.—St. Croix; St. Thomas.

120. M. urens, L. *α*) and *β*) **lanceolata.**

Fl. June–Oct. *α*) common in thickets.—All islands; *β*) rare, St. Croix (Spring-gut).

121. M. Cnida, Spreng. (Neue Entdeck. iii, 51).

Fl. June–Sept. Along roads and in thickets, not uncommon.—St. Jan; Water Island; Vieques.

122. M. angustifolia, L.

Fl. June–Oct. In thickets, not uncommon.—Water Island; Vieques.

123. Stigmaphyllon periplocifolium, Juss.

Fl. all the year round. Samaræ red. In thickets, common.—All islands.

124. Heteropteris purpurea, Kth.

Fl. all the year round. Common in hedges and thickets.—All islands.

125. H. parvifolia, DC. (v. Bull Vis).

Fl. all the year round. As common as the preceding species.—All islands.

SAPINDACEÆ.

126. Cardiospermum Halicacabum, L. (v. Balloon-vine).

Fl. Sept.–March. Rather common in thickets and near dwellings.—St. Croix; St. Thomas.

127. C. microcarpum, Kth.

Fl. Jan.–March. In thickets, rare.—St. Croix (Spring-gut); St. Jan (Enigheit).

128. Serjania lucida, Schum. (v. White Vis, Cabrite rotting).

Fl. Dec.–June. Stem used as rope. Common in thickets.—All islands.—(*Paullinia curassavica*, West, p. 281, is no doubt a mistake for this species.)

129. Cupania fulva, Mart.

Fl. January. In forests, not uncommon.—Virgin Islands.

130. Sapindus inæqualis, DC. (v. Soap-seed).

Fl. Dec.–Jan. Seeds used for ornaments. In forests along rivulets. Not uncommon.—St. Croix.

131. Schmidelia occidentalis, Sw.

Fl. May–Sept. Not uncommon in forests, especially in St. Croix.—All islands.

132. Melicocca bijuga, L. (v. Keneppy tree).

Fl. April–May. Leafless during flowering. Flowers fragrant. Fruit astringent, edible. Naturalized and now very common everywhere,

often forming a secondary growth in cleared woodland. Introduced from the Spanish main.—All islands.

133. Dodonæa viscosa, L.

Fl. April. On sandy seashores, rare.—St. Croix (Sandy Point).

MELIACEÆ.

134. Melia sempervirens, Sw. (v. Lilac, Hagbush).

Fl. all the year round. Common in forests and near dwellings.—All islands.

135. Trichilia hirta, L.

Fl. June–July. Common in thickets.—All islands.

(*Guarea trichilioides*, Jacq., said to occur in St. Croix (West, p. 281), seems to me rather doubtful.)

136. Swietenia Mahagoni, L. (v. Mahogany).

Fl. April–June. In wooded valleys and along roads and dwellings. Not uncommon.—St. Croix; St. Thomas.

GERANIACEÆ.

[Cultivated occur several species of Geranium, L'Her., and Pelargonium, L'Her.]

BALSAMINACEÆ.

137. Balsamina hortensis, Desp. (v. Lady-slippers).

Fl. all the year round. Naturalized everywhere in gardens. Seeds often germinating in the capsule.—All islands.

AURANTIACEÆ.

138. Citrus medica, L. *α*) (v. Citron). *β*) **Limonum,** Risso (v. Lime).

Fl. April–May. *α*) naturalized, but rare, in gardens. *β*) naturalized, common in gardens and near dwellings, also in forests.—All islands.

139. C. Aurantium, L. *α*) (v. Orange). *β*) **Bigaradia,** Duh. (v. Seville Orange).

Fl. May–July. Both forms naturalized in gardens, especially *α*). Common in St. Croix; rare in St. Thomas and St. Jan, where the species is said to have died out nearly, from disease.—(Mentioned also by Breutel, London Journal of Botany, ii.)

140. C. buxifolia, Padr. (v. Forbidden Fruit).

Fl. July. Naturalized in a few places.—St. Croix; St. Thomas.

141. C. decumana, L. (v. Shaddock).

Fl. July–Aug. Fruit used for preserves. Naturalized in gardens.—St. Croix; St. Thomas.

142. Triphasia trifoliata, DC. (v. Sweet Lime).

Fl. April–June. Naturalized in thickets and near dwellings. Common in all the islands.

[Cultivated species: *Murraya exotica*, L. (v. Cyprian), and *Cookia punctata*, Retz.]

OXALIDACEÆ.

143. Oxalis Martiana, Zucc.

Fl. May–Aug. Naturalized in gardens on all the islands.

144. O. corniculata, L. *β*) **microphylla,** Poir.

Fl. all the year round. Gregarious in fields.—St. Croix (Annally); St. Thomas.

ZYGOPHYLLACEÆ.

145. Tribulus cistoides, L.

Fl. all the year round. Along roads and in open spots, gregarious.—St. Croix (in the easternmost part of the island only).

146. T. maximus, L. (v. Centipee-root, Longlo).

Fl. all the year round. Stamens alternately of equal length. The whole plant is used in baths against boils. A very common weed along roads and in waste places.—All islands.

147. Guajacum officinale, L. (v. Lignum vitæ, Pockenholt).

Fl. March–April. Common in former times, but now nearly exterminated. On the seashore and in forests, rare.—All islands.

RUTACEÆ.

148. Pilocarpus racemosus, Vahl.

Fl. Feb.–March. Leaves undivided, 3-foliate or impari-pinnate in the same specimen (as stated in Hook. & Benth. Genera, i, 299, and Fl. Brasil. fasc. 65). Inflorescence terminal and axillary. A low tree. In forests, rare.—St. Jan (Kingshill, 1000′); Vieques (Ravn in Hb. Havn.). (Specimen from Montserrat in Hb. Havn. also named *P. laurifolius*, Vahl.)

149. Tobinia punctata, Gr.

Fl. Sept. Leaves often pinnate. Dots on the leaves pellucid. In thickets, not uncommon.—St. Croix.

150. T. spinosa, Desv.

Fl. May–June. Leaflets prickly on the principal nerves on both sides, bearing 2 stipular prickles at the base. Carpids 3 (2–1) globose, with a short beak, black, verrucose, 3‴ long. Seeds black, shining. Rare in forests.—St. Thomas (Flag Hill, 600′).

151. Fagara microphylla, Desf. (v. Ramgoat-bush) (*F. tragodes,* Jacq. in West).

Fl. June–Dec. Dots of the leaves pellucid. The whole plant has a strong smell. Not uncommon in thickets.—St. Croix; Buck Island, near St. Croix.

152. Zanthoxylum Clava-Herculis, L. (v. White Prickle).

Fl. April–June. Aculei corky, 6‴ long, greyish, with a narrow brown point. In forests, not uncommon.—All islands.

153. Z. flavum, Vahl (Naturh. Selsk. Skrift. vi, 132, 1810) (v. Yellow Sander).

Not seen flowering. A fine timber-tree, used for furniture. Not uncommon in forests in former times, but now nearly extinct.—St. Jan (Bordeaux Hills) (St. Croix? St. Thomas?) (Montserrat, Ryan in Hb. Havn.); Martinique (West in Hb. Havn.).

154. Z. Ochroxylum, DC. (v. Yellow Prickle) (*Z. simplicifolium,* Vahl in Hb. Havn.).

Fl. June–Nov. ♀ Panicle 1″ long; pedicels ½‴ long, bracteole at the base deciduous. Calyx 5-partite, ½‴ diam. Petals 5, imbricate, white, ¾‴ long, pellucid-dotted. Style thick, ¼‴ high; stigmas triangular. Ovaries 3 on a short gynophore. Carpids 3 (1–2) globose, verrucose, partly dehiscent, 1½‴ diam. Seed shining-black. Stem armed with large corky aculei, often connected and forming long ridges down the stem. Wood yellow. The whole plant is possessed of the same strong smell as Fagara. Not uncommon in forests.—St. Thomas (Flag Hill 600′); St. Jan (Rogiers) (Montserrat, Ryan in Hb. Havn.; Martinique, South America, Hb. Havn.). (A branch without flowers, marked *Z. macrophyllum,* St. Croix, Ryan in Hb. Havn., seems to belong to this species.)

155. Quassia amara, L. fil. (v. Quassia).

Fl. Nov.–Feb. Naturalized in gardens.—All islands.

156. Castela erecta, Turp.

Fl. Feb.–June. Petals purple. ♀ with 8 rudimentary stamens, alternately of equal size. Carpids 2–3–4. In dry thickets along the south coast, not uncommon.—St. Croix.

157. Picræna excelsa, Lindl. (v. Bitter-ash).

Not seen flowering. Wood very bitter, used for stomachic properties in drinks. In forests, rare.—St. Croix; St. Jan.

OLACACEÆ.

158. Schœpfia arborescens, R. S.

Fl. Feb.–March. Fruit nearly always 1-seeded by abortion. Here and there in forests.—St. Croix (Saltriver, Wills Bay); St. Thomas (Crown, 1400′).

AMPELIDEÆ.

159. Cissus sicyoides, L. (v. Lambrali, Pinna koop).

Fl. all the year round. Flowers purple or yellow. Aërial roots long, filiform. Common in forests.—All islands.

160. C. trifoliata, L.

Fl. all the year round. On rocks and trees, not common.—St. Croix; St. Thomas.

161. C. acida, L.

Fl. June–Aug. In thickets near the coast, common.—All islands.

162. Vitis caribæa, DC.

Fl. June. In dense forests, rare.—St. Croix (Caledonia Gut); St. Thomas (Crown).

CELASTRACEÆ.

163. Maytenus elæodendroides, Gris. (Cat. Plant. Cub. p. 54). (*Rhamnus polygamus*, Vahl in Hb. Havn., and in West, p. 276.)

Fl. Dec. Flower brownish, small. Calyx 5-partite, $\frac{3}{4}'''$ diam. Petals 5, oval, $1'''$ long. Stamens 5, often all or part of them transformed into petals and more or less sterile. Stigma subsessile, 2-lobed. Ovary 2-locular, 2-ovulate. Disc brown, undulate, $\frac{1}{2}'''$ high. Seed black with a red arillus. Rare in dry thickets.—St. Croix (Fair Plain).

164. M. lævigatus, Gris. in litt. (*Rhamnus lævigatus*, Vahl in Symb. Bot. iii, 41; *Ceanothus*, DC.).

Fl. May–Oct. Capsule tardily dehiscent, 1–3-seeded, $6'''$ long. Seeds brown, reticulate with red veins, $2'''$ diam. Arillus tough, white. A shrub or middle-sized tree. Not uncommon in forests.—All islands.

165. Elæodendron xylocarpum, DC. (v. Spoon-tree, Nut Muscat).

Fl. Sept.–Dec. Stamens often transformed, as in *Maytenus elæodendroides*. Drupe orange-coloured, $8'''$ long. Common on rocky shores; more uncommon in St. Croix.—All islands.

166. Myginda pallens, Sw.

Fl. Oct.–May. Common in thickets, principally in marshy soil.—All islands.

167. M. latifolia, Sw.

St. Croix (Pflug, sec. Vahl Symb. Bot. ii, 32); St. Thomas (Schl.).

168. Schæfferia frutescens, Jacq.

Fl. Sept.–Dec. Common in thickets.—All islands.

RHAMNACEÆ.

169. Reynosia latifolia, Gris. (Cat. Pl. Cub. 34) (v. Guama). Emend. in Eggers, Videnskab. Medd. fra Naturhist. Forening, Copenhagen, 1878, cum icone, p. 173.

Fl. June–July. Common in dry thickets.—Virgin Islands.

170. R. mucronata, Gris. (l. c.) (Eggers, l. c).

Not seen flowering. Rare in dry thickets near the coast.—St. Croix (easternmost part of the island, near Tague Bay).

171. Condalia ferrea, Gris. (v. Edden-wood).

Fl. Sept.–Jan. Keel of the calyx-lobes foliaceous. Drupe oval, 2½‴ long. Not uncommon in thickets and forests.—All islands.

172. Colubrina ferruginosa, Brongn.

Fl. Jan. and May–July. A low shrub. Common on sandy shores.—All islands.

173. C. reclinata, Brongn. (v. Snake-root, Mabee-bark).

Fl. Nov.–March. Style 2–3-partite. Leaves used for the preparation of stomachic drinks. Not uncommon in thickets.—All islands.

174. Zizyphus reticulata, DC. (Prodr. ii, 20) (*Paliurus,* Vahl, Ecl. Am. iii, 6).

Fl. July. Disc brownish. Capsule 3-locular, one seed in each cell, 5‴ long, glabrous. Seeds purple; pulp reddish brown. In dry thickets, rare.—St. Croix (Fair Plain).

175. Gouania domingensis, L. (v. Soap-stick, Silvi).

Fl. Oct.–Jan. Stem used as rope. Common in thickets.—All islands.

TEREBINTHACEÆ.

176. Bursera gummifera, L. (v. Turpentine-tree).

Fl. April–Sept. Protandrous. Easily propagated by large cuttings, and generally used for forming fences. Common in forests and along roads.—All islands.

177. Hedwigia balsamifera, Sw.

St. Croix (West in Hb. Havn. and p. 281 as *Icica altissima*).

178. Amyris sylvatica, Jacq. (v. Flamboyant).

Fl. Feb.–April and July–Sept. Inflorescence trichotomous. Wood resinous and used for torches, especially in catching lobsters at night. Not uncommon in forests.—All islands.

179. Spondias lutea, L. (v. Hog-plum).

Fl. March, coëtaneous, and later July. Leaves deciduous in Feb. Fruit oval, edible. Common in forests.—All islands.

180. S. purpurea, L. (v. Jamaica Plum).

Fl. Feb.–March, precocious. Naturalized in gardens and wooded valleys.—All islands.

181. Rhus antillana, Egg. (n. sp.).

Sect. Sumach. Leaves impari-pinnate; leaflets 4–5-jugal, petiolulate, lanceolate, acuminate, obtuse at the base, entire, glabrous, chartaceous; veins prominulous beneath. Cyme ramose; branchlets bracteolate, equalling the leaves. Flower pedicellate, small, green, 5-merous, mostly ♂, the rest hermaphrodite. Calyx and petals persistent in the fertile flower. Stamens erect, a little longer than the petals, inserted into a fleshy central disc; filaments villous at the base. Ovary inserted upon a short fleshy gynophore. Drupe globose, glabrous, 1-seeded by abortion. A low tree. Approaching *R. metopium*, L. Fl. Jan. In forests, rare.—St. Thomas (Signal Hill, 1400′); St. Jan (Hb. Havn. as Xanthoxylum). (St. Croix, Stony-ground!)

182. Comocladia ilicifolia, Sw. (v. Prapra).

Fl. March–May. Root containing a lasting red dye. Common on limestone.—All islands.

183. Mangifera indica, L. (v. Mango-tree).

Fl. Feb.–April. Fruit edible. Introduced towards the close of last century, and now cultivated and naturalized everywhere.—All islands.

184. Anacardium occidentale, L. (v. Cashew, Cherry).

Fl. Dec.–April. Pedicel becoming fleshy, and containing in abundance a slightly astringent juice. Seeds used as almonds. Common in forests and along roads.—All islands.

LEGUMINOSÆ.

185. Crotalaria verrucosa, L.

Fl. all the year round. Naturalized along roads. Very common.—All islands.

186. C. retusa, L.

Fl. all the year round. Common along roads and in waste places. Naturalized.—All islands.

187. C. latifolia, L.

Fl. Nov. Leaves golden sericeous beneath. Corolla greenish. Not uncommon in thickets.—All islands.

188. C. incana, L. (v. Rattle-bush).

Fl. all the year round. Stipules deciduous, the scar exuding nectar afterwards, as well as the base of the bracteoles. Common along roads and near dwellings.—St. Croix; St. Thomas.

189. Indigofera tinctoria, L.

Fl. April–Aug. Cultivated in former times, but now only found wild or naturalized. Common in dry localities.—All islands.

190. I. Anil, L.

Fl. all the year round. The whole plant is much attacked by insects. Very common in dry thickets.—All islands.

191. Tephrosia cinerea, Pers. *a*) and *β*) litoralis, Pers.

Fl. Feb.–June. Both forms here and there in thickets.—All islands.

192. Cracca caribæa, Benth.

St. Croix (Schl.); St. Thomas (Gris. Fl. p. 183).

193. Coursetia arborea, Gris.

St. Jan (Gris. Fl. p. 183).

194. Sabinea florida, DC. (v. Waterpanna).

Fl. March–July. Precocious. Wood used for fishpots. Gregarious. Common in thickets and forests.—Virgin Islands. (Cultivated in St. Croix.)

195. Pictetia squamata, DC. (Prodr. ii, 314) (v. Fustic).

Fl. June. Flowering period only 5 or 6 days. Branches in this and the following species commonly transformed into brachyblasts. Common in forests and thickets.—Virgin Islands.

196. P. aristata, DC. (l. c.) (v. Fustic).

Fl. Feb., March, and June–Aug. Rather common in thickets.—Virgin Islands; St. Croix (Jacq. Hort. Schœnbr. ii, 60).?

(Both species are perhaps to be united, as proposed by Jacquin.)

197. Agati grandiflora, Desv.

Fl. all the year round. Naturalized in gardens, common.—All islands.

198. Sesbania sericea, DC.

Fl. Nov. In thickets near the coast, uncommon.—St. Thomas (Flag Hill).

199. Æschynomene americana, L.

Fl. Nov.–Jan. In pastures and along roads, not uncommon.—St. Croix.

200. Zornia diphylla, Pers.

Fl. July–Aug. In pastures on high hills, rare.—St. Thomas (Signal Hill, Crown).

201. Lourea vespertilionis, Desv.

Fl. Feb.–April. Naturalized in gardens.—St. Croix; St. Thomas.

202. Alysicarpus vaginalis, DC.

Fl. Nov.–Dec. Leaves very variable. Along roads, common.—All islands.

203. Desmodium triflorum, DC.

Fl. Dec.–Feb. Common near ditches and in moist localities.—All islands.

204. D. incanum, DC.

Fl. Oct.–Jan. Common in pastures.—All islands.

205. D. scorpiurus, Desv.

Fl. Dec.–Jan. In pastures, not very common.—St. Croix; St. Thomas (Duchass).

206. Desmodium tortuosum, DC.

Fl. Oct.–Jan. Common in pastures.—St. Croix; St. Thomas.

207. D. spirale, DC.

Fl. Nov.–Jan. Not uncommon in pastures and along roads.—All islands.

208. D. molle, DC.

Fl. Dec.–Jan. Lomentum often 3–4-jointed. Rather common in pastures.—St. Croix; St. Thomas.

209. Stylosanthes procumbens, Sw.

Fl. Oct.–Dec. Lomentum in my specimens always 2-jointed. Common along roads.—All islands.

210. S. viscosa, Sw.

St. Croix (West, p. 301). (Perhaps a mistake for the former species.)

211. Arachis hypogæa, L. (v. Pindars, Ground-nuts).

Fl. May–Aug. Seeds used for making cakes or eaten roasted. Cultivated and naturalized.—All islands.

212. Abrus precatorius, L. (v. Jumbee-bead, Scrubber, Wild Liquorice).

Fl. Oct.–Feb. Leaves used for washing clothes. Common in thickets and on hedges.—All islands.

213. Rhynchosia minima, DC. *α*) and *β*) lutea, Egg.

Fl. all the year round. Seeds black, with small grey spots. *α*) Standard veined with purple; a low climber. *β*) Standard uniformly yellow; climbing up to 6′. Both forms common in pastures and thickets.—All islands.

214. R. phaseoloides, DC.

Fl. March. Stem laterally compressed. Rare in forests.—St. Thomas (Signal Hill, 1200′).

215. R. reticulata, DC.

Fl. all the year round. Leaflets as long as 1½″. Common on fences and along roads.—All islands.

216. Cajanus indicus, Spreng. (v. Pigeon-pea, Vendu bountje).

Fl. all the year round. Seeds used as a common vegetable for soup. Cultivated and naturalized.—All islands.

217. Clitoria Ternatea, L. (v. Blue Vine).

Fl. all the year round. Common in thickets.—All islands.

218. Centrosema virginianum, Benth. *α*) and *β*) **angustifolium.**

Fl. all the year round. Very common in ditches and on fences.—All islands.

219. Teramnus uncinatus, Sw., var. **albiflorus**, Egg.

Fl. Sept.–March. Corolla 1½‴ long, constantly white. Legume 1″ long, black, pilose. Common in pastures and along roads.—St. Croix; St. Thomas.

220. Galactia filiformis, Benth.

Fl. Oct.–Jan. Roots often bearing small tubers. Common in thickets.—All islands.

221. G. tenuiflora, W. & A.

Fl. Feb.–June. In forests, rare. There seems not to be sufficient reason for uniting this species to the preceding, as done by Griseb. Fl. p. 194.—St. Thomas (Flag Hill); St. Jan (Rogiers).

222. Vigna luteola, Benth. (v. Wild Pea).

Fl. all the year round. Common in moist localities.—All islands.

223. Dolichos lablab, L. (*D. benghalensis*, Jacq.).

Fl. all the year round. Seeds brown. Very common along the seashores.—All islands.

224. Phaseolus lunatus, L. (v. Bonny Vis).

Fl. Dec.–Feb. Corolla white or rosy. Naturalized in thickets and near dwellings.—All islands.

225. Ph. vulgaris, L. (v. White Bean).

Fl. Feb.–July. Cultivated and naturalized near dwellings.—All islands.

226. Ph. alatus, L.

St. Croix (West, p. 299).

227. Ph. semierectus, L.

Fl. all the year round. Flower expanded only in the sun. Common along roads and in pastures.—All islands.

228. Canavalia parviflora, Benth. (Flor. Bras. xv, i, 177).

Fl. Feb. Inflorescence extra-axillary (as in *C. bonariensis*, Lindl. Bot. Reg. 1199). Legume broad on the back, without prominent ridges, 3″ long, 1¼″ broad. Seeds crimson, shining, ¾″ long. In forests, rare.—St. Thomas (Signal Hill, 1300′).

229. C. gladiata, DC. *β*) **ensiformis**, DC. (v. Sour-eyes, Overlook) (*Dolichos acinaciformis*, Jacq. Icon. Rar. t. 559). Bot. Mag. 4027.

Fl. Aug.–Dec. Naturalized in provision grounds.—St. Thomas (Signal Hill, 1200′).

230. C. obtusifolia, DC. (*Dolichos rotundifolius*, Vahl).

Fl. all the year round. Common along the seashore.—All islands.

231. Mucuna pruriens, DC. (v. Cow-itch).

Fl. Oct.–Nov. In shady valleys. Rare.—All islands.

232. Erythrina Corallodendron, L. (v. Flamboyant).

Fl. Feb.–April. Precocious. Stamens all of unequal length. Rather common, especially along roads and near dwellings.—All islands.

233. E. horrida, Egg. (n. sp.).

Fl. Feb.–March. Very prickly. Approaching to the preceding, but stem, branches, petiole, and leaf-ribs on both sides armed with stout and straight prickles; legume terete, long-beaked. A low tree, branches procumbent. In forests, not uncommon.—All islands.

234. Piscidia Erythrina, L. (v. Dog-wood, Stink-tree).

Fl. March–April. Precocious. Only those individuals that flower drop the leaves. Common in thickets.—All islands

235. Drepanocarpus lunatus, Mey.

St. Croix (Isert, 1787, in Hb. Havn; West, p. 298).

236. Hecastophyllum Brownei, Pers.

Fl. June–Dec. Not uncommon on sandy shores.—All islands.

237. Andira inermis, Sw. (v. Dog Almond, Bastard Mahogany, Hon Kloot).

Fl. May–Aug. and Dec. Not uncommon in forests and along rivulets.—All islands.

238. Sophora tomentosa, L.

Fl. July–Jan. Along sandy shores, rare.—St. Croix (White's Bay, Turner's Hole).

239. Myrospermum frutescens, Jacq.

Fl. May–June. Legume resinous. Naturalized near dwellings.—St. Croix.

240. Hæmatoxylon campechianum, L. (v. Logwood).

Fl. Feb.–May. The young plants prickly on the stem. Here and there on sandy shores. More common in former times.—All islands.

241. Parkinsonia aculeata, L. (v. Horse-bean).

Fl. all the year round. Common in dry localities.—All islands.

242. Guilandina Bonduc, L. (v. Yellow Nickars).

Fl. May–Oct. Common along sandy shores.—All islands.

243. G. melanosperma, Egg. (n. sp.) (v. Black Nickars).

Fl. June–Oct. Resembling the preceding, but leaflets smaller, glabrous, shining, prickles red and seeds shining-black. Seeds used for ornaments. In dry thickets near the shore, rare.—St. Croix (Sandy Point, Grape-tree Bay).

244. G. Bonducella, L. (v. Grey Nickars).

Fl. all the year round. Anthers successively dehiscent. Flowers polygamous. Very common along sandy shores.—All islands.

245. Cæsalpinia pulcherrima, Sw. (v. Dudeldu).

Fl. June–Dec. Bracteoles large, subulate, but deciduous before the expansion of the flower. Commonly naturalized along roads and near dwellings.—St. Croix; St. Thomas.

246. Poinciana regia, Boj. (Bot. Mag. 2884) (v. Flamboyant).

Fl. May–July. Bracteoles as in the preceding. Leaves deciduous Dec.–April. A handsome tree of very quick growth. Naturalized in gardens and near dwellings.—St. Croix; St. Thomas.

247. Lebidibia coriaria, Schl. (v. Dividivi).

Fl. April–May. Legume used for tanning purposes. Rather common on dry hills.—Virgin Islands (St. Croix, cultivated).

248. Cassia Fistula, L.

Fl. Sept. Naturalized here and there in shady valleys.—St. Croix (The William).

249. C. grandis, L. (v. Liquorice-tree).

Fl. April–July. The pulp containing rhaphides in abundance. Naturalized and cultivated near dwellings.—St. Croix; St. Thomas.

250. C. bacillaris, L.

Fl. Nov.–May. Common in thickets and woods on high hills.—St Thomas.

251. C. bicapsularis, L. (v. Stiverbush, Styver bla).

Fl. all the year round. Very common in waste places.—All islands.

252. C. florida, Vahl.

Fl. Dec. Naturalized near towns.—St. Thomas.

253. C. biflora, L. β) angustisiliqua, Lam.

Fl. Nov.–May. In thickets, rare.—St. Croix (Longford).

254. C. alata, L. (v. Golden Candlestick, Fleïti).

Fl. May–Nov. Along rivulets, not uncommon.—Virgin Islands (naturalized in St. Croix).

255. C. occidentalis, L. (v. Stinking-weed).

Fl. all the year round. Root used against fever. A very common weed near dwellings and in waste places.—All islands.

256. C. obtusifolia, L.

Fl. June–Nov. Common in dry localities.—St. Croix; St. Thomas.

(*C. triflora*, Vahl (Eclog. Am. iii, p. 11) (West, St. Croix), is a doubtful species. I have not been able to find the original specimen of Vahl in Hb. Havn.)

257. C. glandulosa, L. α) stricta, Schl., and β) ramosa.

Fl. all the year round. Both forms common in pastures and along roads.—All islands.

258. C. nicticans, L.

Fl. all the year round. In the same localities as the preceding.—St. Croix; St. Thomas.

259. Tamarindus indica, L. (v. Tamarind-tree).

Fl. March–June. Naturalized everywhere, especially near dwellings.—All islands.

260. Hymenæa Courbaril, L. (v. Locust-tree).

Fl. Jan. and July–Aug. Bracts large, early deciduous. The wood is an excellent timber on account of its being very hard and close-grained. In forests, here and there.—All islands.

261. Bauhinia tomentosa, L.

Fl. May–June. Leaves partly deciduous in March. Naturalized in gardens and near dwellings.—St. Croix; St. Thomas.

262. B. ungula, Jacq

St. Thomas (Gris. Fl. 214).

263. Adenanthera pavonina, L. (v. Coquelicot).

Fl. July–Oct. Naturalized near dwellings and in shady valleys.—All islands.

264. Neptunia pubescens, Benth.

Fl. Aug. Legume containing as many as 9 seeds. Rare.—Buck Island, near St. Thomas.

265. Desmanthus virgatus, W. *α*) and *β*) **striotus,** Bert.

Fl. all the year round. Both forms common in pastures and along roads.—All islands.

266. D. depressus, Kth.

St. Thomas (Schl.).

267. Mimosa pudica, L. *α*) (v. Gritchee).

Fl. all the year round. In pastures and along roads.—St. Croix (very rare, Mt. Stewart); Virgin Islands (common).

268. M. asperata, L.

St. Thomas (Gris. Fl. 219).

269. M. Ceratonia, L. (v. Black Amaret, Amaretsteckel).

Fl. June–Dec. On high hills.—St. Croix (West, p. 312; his specimens are found in Hb. Havn.); Virgin Islands (common).

270. Leucæna glauca, Benth. (v. Wild Tamarind).

Fl. all the year round. Leaflets closing together in strong sunlight. Seeds used for fancy work, such as collars, baskets, etc. Very common everywhere, also as secondary growth on cleared woodlands.—All islands.

271. Acacia Catechu, W.

Fl. May–July. Stem furnished with strong black aculei. Naturalized in shady valleys.—St. Croix (Crequis).

272. A. nudiflora, W. (v. Amaret).

Fl. May and Nov.–Dec. Protandrous. Young foliage reddish. Wood used for fencing. A low tree. Common in thickets and woods.—Virgin Islands.

273. A. sarmentosa, Desv. (v. Catch-and-keep, White Police).

Fl. July–Sept. Stem generally angular or even winged. A very spiny climbing shrub, the recurved spines of which often make thickets impenetrable. Common on dry hills.—Virgin Islands.

274. A. macracantha, HB. *β*) **glabrens** (v. Stink Cashú).

Fl. Dec.–April. A shrub or low tree. Wood exhaling a very disagreeable odour. Common in thickets on dry hills.—All islands.

275. A. tortuosa, W. (v. Cashú).

Fl. all the year round. Flowers fragrant. Bracteoles rhomboid, ciliate. Often gregarious. Common on dry hills.—All islands.

276. A. Farnesiana, W. (v. Cashú).

Fl. all the year round. Flowers fragrant; bracteoles spathulate, ciliate. Foliage of this and the two former species eaten by goats, and their wood generally used for making charcoal. Common in dry localities.—All islands.

277. A. arabica, W.

Fl. Nov.–Jan. Naturalized near dwellings.—St. Croix; St. Thomas.

278. A. Lebbek, W. (v. Thibet-tree).

Fl. April–Sept. Leaves deciduous Nov.–March. Flowers fragrant. Foliage eaten by cattle. The tree is often overgrown by *Loranthus emarginatus*. Naturalized in pastures and elsewhere.—St. Croix (very common); Virgin Islands (common, except St. Jan, where the tree seems not to thrive).

(*A. frondosa*, W., var. *eglandulosa*, St. Thomas, is mentioned by Schlechtendal as spontaneous, but, being an East Indian species, is most probably only cultivated or at most naturalized. I have not seen the species in the island.)

279. Calliandra portoricensis, Benth.

Fl. Feb. Climbing by the aid of young branches that twine themselves around the branches of other trees. In forests, rare.—St. Jan (King's Hill); Vieques.

280. C. purpurea, Benth. (v. Soldier-wood, West).

St. Croix (Gris. Fl. p. 224, probably on the authority of West. This author, however, says, p. 312, that the tree is only cultivated in the island. His specimens are in existence in Hb. Havn. I have not seen the tree on the island).

281. C. Saman, Gris. (v. Giant Thibet-tree).

Fl. May–Aug. A very large tree of quick growth. Naturalized near dwellings and planted along roads.—St. Croix; St. Thomas.

282. Pithecolobium unguis-cati, Benth. *α*) and *β*) **forfex**, Kth. (v. Crab-prickle).

Fl. Sept.–Jan. Gynophore 1‴ long. Seeds black, shining; arillus rosy. Wood used for fishpots. Both forms common on limestone and in marshy soil.—All islands.

283. Inga laurina, W. (v. Lady-finger-tree).

Fl. July–Sept. and Jan.–March. Petiole bearing a narrow wing on each side. Corolla greenish. (Jacquin's drawing does not show any wing on the petiole. In the letterpress, however, of his Stirp. Am., he expresses a doubt whether the petiole is winged or not.) Wood used for fences, etc. Common in forests.—All islands.

[Cultivated species: *Pisum sativum*, L. (v. Green Pea); *Dolichos sphærospermus*, DC. (v. Black-eye Pea); *D. sesquipedalis*, L.; *Poinciana Gilliesii*, Hook.; and a *Casparea*.]

CHRYSOBALANACEÆ.

284. Chrysobalanus Icaco, L. (v. Cocoa-plum, Cacos).

Fl. Dec.–Feb. and July–Aug. Fruit black or white; used for preserves. On sandy shores or in forests on high hills. Common.—All islands.

ROSACEÆ.

[Many varieties of *Rosa gallica*, L., and *R. centifolia*, L., are cultivated in gardens on all the islands, and are flowering abundantly all the year round. In the time of West (c. 1790), roses were rare, and flowered but seldom, so that we here seem to have an instance of gradual acclimatisation.]

MYRTACEÆ.

285. Calyptranthes Thomasiana, Berg (Linnæa, xxvii, 26).

St. Thomas (Ventenat and Ravn in Hb. Havn.).

286. C. Chytraculia, Sw. β) **ovalis**, Berg, and ε) **Zyzygium**, Berg (l. c. p. 28).

In forests, rare.—St. Thomas; St. Croix.

287. C. pallens, Gris.

Fl. July–Aug. Branchlets quadrangular. In forests, rare.—St. Croix (Kingshill Gut); St. Thomas (Crown).

288. Myrcia coriacea, DC. γ) **Imrayana**, Gris.

Fl. June–July. In forests on high hills, uncommon.—All islands.

289. Jambosa malaccensis, DC.

Fl. April–May. Naturalized in shady valleys; rare.—St. Croix (Crequis).

290. J. vulgaris, DC. (v. Pomerose-tree).

Fl. March–June. Fruit used for preserves. Naturalized along rivulets and in forests, common.—All islands.

291. Eugenia buxifolia, W.

Fl. June–Sept. Petioles reddish. Gregarious, especially along the seashore.—St. Croix; St. Thomas.

292. E. Poiretii, DC.

St. Thomas (Gris. Fl. 236).

293. E. monticola, DC.

Fl. July–Sept. Leaves variable, distichous. Flowers strongly fragrant. When not flowering, the shrub emits a fœtid smell. Rather common in forests.—All islands.

294. E. axillaris, Poir.

Fl. Aug.–Oct. Leaves variable. Petiole reddish. In thickets; rare.—St. Croix (Lebanon Hill, Fair Plain).

295. E. lateriflora, W. (*E. cordata*, DC. Prodr. iii, 272, and probably *E. sessiliflora*, ib. 273).

Fl. Sept.–Nov. Leaves very variable, ovate, cuneate, or oblong. Flowers sessile or subsessile, crowded in the axils. Berry globose, purple, 2‴ diam. Common in thickets and forests.—All islands.

296. E. sessiliflora, Vahl (Symb. Bot. iii, 64).

Fl. July–Oct. Fruit large, rosy, ¾″–1″ diam. Flowers sessile, large, white, 5‴ diam. In thickets, not uncommon.—St. Croix; St. Thomas (Cowell's Hill).

(Both DC. and Gris. seem to confound these two very distinct species, the flowers and fruits of which are highly different in most respects. DC. Prodr. iii, 273, says of his *E. sessiliflora:* Fructus dimidio minor quam *E. lateriflorœ*, yet immediately above he says of this latter species: Fructus et sem. ignoti. Vahl's description is very correct, also, of the fruit, of which he says: Pruni magnitudine, globosus.)

297. E. flavovirens, Berg (l. c.).

St. Jan (Ravn in Hb. Havn.).

298. E. glabrata, DC. (Prodr. iii, 274).

St. Croix (Berg).

299. E. pallens, DC. (*E. nitida*, Vahl in Hb. Havn.) (v. Cromberry).

Fl. Sept.–Nov. Leaves shining. In forests, uncommon.—All islands.

300. E. acetosans, Poir. (DC. Prodr. l. c. 283).

St. Jan (in forests, Berg in Linnæa, xxx, 662); St. Croix (Mount Eagle, Richard).

301. E. virgultosa, DC.

Fl. April–July. Leaves variable. Common along the seashore and in forests.—All islands.

302. E. procera, Poir. (v. Black Cherry, Rock-myrtle) (*Myrtus cerasina*, Vahl in West, p. 290).

Fl. Feb. and Aug.–Nov. Flowers fragrant; fruit edible; a favourite food for wild pigeons. In forests, common.—All islands.

303. E. pseudopsidium, Jacq. (*E. Thomasiana*, Berg) (v. Bastard Guava, Christmas Cherry).

Fl. April–Dec. Flowers fragrant; fruit oval. A shrub or low tree. In forests, not uncommon.—All islands.

304. E. ligustrina, W.

Fl. April and Sept. In thickets and woods, common.—All islands.

305. E. portoricensis, DC. (Prod. iii, 266) (*Stenocalyx*, Berg).

St. Croix (ex Hb. Vahlii in Hb. Berol.).

306. E. uniflora, L. (v. Surinam Cherry).

Fl. March–Aug. Fruit edible, acidulous. A middle-sized tree. Naturalized and planted in gardens.—St. Croix; St. Thomas.

307. E. floribunda, West (v. Guava-berry).

Fl. June–Aug. Berry black, globose, shining, 4‴ diam., aromatic; used for preserves or put in rum. In forests, not uncommon.—All islands.

(*E. marginata* and *E. micrantha*, West, p. 290, are not mentioned in Vahl's Symb. Bot. pars iii, as stated, and are probably included in some of the species enumerated above.)

308. Anamomis punctata, Gris.

Fl. June. In forests, rare.—St. Croix (Maroon Hill, Wills Bay); St. Jan (Cinnamon Bay).

309. Pimenta vulgaris, W. & A. (v. Cinnamon-bush).

Fl. June–July. In forests, rare. An excellent timber tree.—St. Croix (Maroon Hill); Virgin Islands.

310. P. acris, W. & A. (v. Bay-leaf). *a*).

Fl. July–Aug. From the leaves the well-known bay-rum is distilled. In forests near the coast, not common.—St. Croix; Vieques.

311. Psidium Guava, Radd. (v. Guava). *a*).

Fl. all the year round. Fruit edible; also used for preserves. Very common, overrunning pastures and becoming troublesome in many places.—All islands.

312. P. cordatum, Sims. (v. Sperry Guava).

Fl. May–July. Fruit fragrant. In thickets on hills, not uncommon.—Virgin Islands.

313. Punica granatum, L. (v. Pomegranate).

Fl. April–Oct. Flowers crimson or yellow Fruit the same. Naturalized in valleys and near dwellings.—All islands.

314. Mouriria domingensis, Walp. (*Petaloma Mouriri*, Sw.).

St. Croix (Baudonius Gut, West, p. 285, and specimens in Hb. Havn.).

[Cultivated species: *Myrtus communis*, L. (v. Myrtle), and *Couroupita guianensis*, Aubl. (v. Nutmeg).]

MELASTOMACEÆ.

315. Clidemia hirta, Don.

St. Thomas (Riedlé sec. Naudin, Ann. des sc. nat. 1853, xviii, p. 532).

316. C. spicata, DC.

Fl. June–July. In forests, not uncommon.—All islands.

317. C. rubra, Mart.

St. Thomas (Gris. Fl. p. 248; Finlay sec. Naudin, l. c.).

318. Diplochita serrulata, DC.

Fl. Feb.–May. Not uncommon in wooded valleys.—St. Croix; St. Thomas.

319. Tetrazygia elæagnoides, DC.

Fl. April–Aug. Common in forests and on high hills.—All islands.

320. Miconia argyrophylla, DC.

St. Thomas (Finlay sec. Naudin, Gris. Fl. p. 256).

321. M. impetiolaris, Don.

Leaves as long as 1½′.—St. Croix (West in Hb. Havn.); St. Thomas (Gris. Fl. p. 256; Bonpland sec. Naudin. Montserrat (Ryan in Hb. Havn.).

322. M. prasina, DC.

St. Thomas (Riedlé sec. Naudin).

323. M. lævigata, DC.

Fl. March–July. In forests, not uncommon.—All islands.

324. M. angustifolia, Gris.

Fl. March. A good-sized shrub, often gregarious on limestone.—St. Croix (Benzon in Hb. Havn.); Virgin Islands (not uncommon. Montserrat (Ryan in Hb. Havn.).

[Several of the species mentioned by Naudin as having been collected in St. Thomas I omit as being a rather doubtful habitat. These are: *Tshudya berbiceana*, Gris. (*Miconia*, Naud.); *Cremanium amygdalinum*, Gris. (*Ossæa*, DC.), and *Nepsera aquatica*, Naud.]

LYTHRARIEÆ.

325. Ammania latifolia, L.

Fl. Dec.–June. Here and there in moist localities.—St. Croix (Lower Cove, Anna's Hope); St. Thomas (Flag Hill).

326. Antherylium Rohrii, Vahl (Symb. Bot. iii, 66) (v. Prickle-wood).

Fl. Oct.–March. Precocious. Petiole bibracteate above the middle. In marshy soil near the coast.—St. Croix (rare; Fair Plain, Stony Ground); Virgin Islands (common).

[Cultivated species: *Lawsonia inermis*, L. (v. Mignonette), and *Lagerströmia indica*, L. (v. Queen of Flowers).]

ONAGRACEÆ.

327. Jussieua suffruticosa, L. *a*) ligustrifolia, Kth.

Fl. all the year round. Here and there in moist places.—St. Croix (Crequis, Golden Rock); St. Thomas (Caret Bay).

RHIZOPHORACEÆ.

328. Rhizophora Mangle, L. (v. Mangrove, Mangelboom).

Fl. all the year round. Gregarious along the shore of lagoons.—All islands. (See Botaniska Notiser, 1877, Lund, and Vidensk. Medd. fra Naturhist. Forening in Copenhagen, 1877–78.)

COMBRETACEÆ.

329. Terminalia Catappa, L. (v. Almond-tree).

Fl. Jan.–April and Sept. Naturalized in valleys and near dwellings.—St. Croix (common); Virgin Islands (rare).

330. Laguncularia racemosa, G. (v. White Mangrove).

Fl. all the year round. Wood used for fishpots. Common in salt-water lagoons.—All islands.

331. Bucida Buceras, L. (v. Gregery).

Fl. May–Aug. A splendid timber tree. Leaves often attacked by a fungus (*Erineum*, vide Kunze mycol. Hefte, ii, 148). Flowers often transformed into long monstrosities (figured already in P. Browne's Jamaica, tab. 23). Common in valleys and especially along the coast.—All islands.

332. Conocarpus erecta, L. (v. Button-wood). *a*) and *β*) procumbens, Jacq.

Fl. all the year round. Common along the coast and in lagoons.—All islands.

[Cultivated species: *Quisqualis indica*, L.]

CUCURBITACEÆ.

(Griseb. Flora, and Naudin: Annales des sc. nat. 1859, '62, '63, and '66.)

333. Momordica Charantia, L. *a*) and *β*) **pseudobalsamina** (v. Maid-apple).

Fl. Dec. and April–Aug. Common on fences and near ditches.—All islands.

334. Luffa cylindrica, Roem. (Syn. Mon. ii, 63) (*L. Petola*, Ser. Wight Icon. ii, t. 495) (v. Strainer-vine).

Fl. Oct.–Dec. Tendril 5-fid. Fruit brown, 4″ long. Naturalized on fences.—St. Croix; St. Thomas.

335. Cucurbita Pepo, L. *a*) (v. Pumpkin) and *β*) **Melopepo** (v. Squash).

Fl. May.–Nov. and Feb. Fruit used extensively as a vegetable. Naturalized and cultivated.—All islands.

336. Lagenaria vulgaris, Ser. *a*) (v. Gobie) and *β*) **viscosa**, Egg. (v. Bitter Gobie).

Fl. Sept.–Jan. The whole plant has a strong smell. Tendril 2-fid. *β*) leaves viscous, petiole biglandular near the top. Used as a blister. Not uncommon in waste places. *a*) on fences. Fruit used for goblets.—St. Croix; St. Thomas.

337. Melothria pervaga, Gris.

Fl. Dec.–April. In thickets, not uncommon.—All islands.

338. Cucumis Anguria, L. (v. Cucumber).

Fl. Jan.–March. Anthers glabrous in the bud, pilose after dehiscence, collecting the pollen. Berry used for soup and pickles. Common in pastures and on fences.—All islands.

339. Cephalandra indica, Naud. (l. c. 1866, p. 14) (*Coccinia*, W. & A.).

Fl. Dec.–June. Naturalized near dwellings and in shady valleys.—St. Croix.

340. Trianosperma gracilliflorum, Gris. (*T. Belangerii*, Naud.).

Fl. Nov.–Jan. Leaf 3–5-lobed. Tendril often bifid. In forests, not uncommon.—All islands.

341. T. ficifolium, Mart. (Syst. nat. med. veg. Bras. 79) (*Bryonia*, Lam.).

Fl. March. In forests, not uncommon.—St. Thomas (Soldier Bay); St. Jan (West, p. 301).

342. Anguria trilobata, L.

St. Croix (Ham's Bluff, West, p. 305).

343. A. glomerata, Egg. (n. sp.).

Fl. Feb.–March and May–Aug. Root tuberous. Stem suffruticose, bark greyish. Leaves alternate, ovate-triangulate or 3-lobed, some-

times 3-partite, narrowly cordate at the base, denticulate, acuminate, scabrous above, whitish pubescent beneath. Tendril simple. ♀ flowers glomerate, sessile or subsessile, 8–20 in the glomerule. Calyx urceolate-cylindrical, small. Petals 5, orange-coloured or red, lanceolate, erect, 5‴ long. Style bifid; stigmas thick, globose, obsoletely 2-lobed. Ovary 2-locular; ovules 3–8 in each cell. Berries densely glomerate, sessile or subsessile, oval, glabrous, striate, red, 8‴ long. Seeds 3–8, urceolate-globose, verrucose, brownish, 2‴ long. ♂ unknown. A high climber. Stem often ½″ diam. at the base, succulent. In forests, not uncommon.—St. Croix (Jacob's Peak, Claremont,); St. Thomas (Picaru Peninsula).

All Cucurbitaceæ are protogynous.

[Cultivated species: *Sechium edule*, Sw. (v. Choco); *Cucumis sativus*, L. (v. Mutton-cucumber); *C. Melo*, L. (v. Muskmelon), and *Citrullus vulgaris*, Schrader (v. Watermelon).]

PAPAYACEÆ.

344. Carica Papaya, L. (v. Papaw).

Fl. March–Aug. Stem often branched. Fruit used as a vegetable. Common near dwellings and in waste places. All islands.

PASSIFLORACEÆ.

345. Passiflora suberosa, L. (v. Pop, Indigo-berry).

Fl. Sept.–Dec. Common on rocks and fences.—All islands.

346. P. pallida, L.

Fl. Oct.–Dec. In forests, rare.—St. Croix (Wills Bay); St. Jan.

347. P. hirsuta, L. (*P. parviflora*, Sw.)

St. Croix (West, p. 30.

348. P. peltata, Cav.

St. Thomas (Schl.).

349. P. rubra, L.

Fl. Sept.–Feb. In forests and on rocks.—St. Croix (rare); Virgin Islands (common).

350. P. laurifolia, L. (v. Bell-apple).

Fl. all the year round. Leaf-margin glanduliferous. Berry fragrant, containing an edible pulp. In thickets on high hills (perhaps only naturalized) and cultivated.—All islands.

351. P. incarnata, L.

St. Croix (West, p. 304).

352. P. fœtida, L. (v. Love in the mist).

Fl. Sept.–Jan. Protandrous. On fences and near ditches, common.—St. Croix; St. Thomas.

[Cultivated species: *P. quadrangularis*, L. (v. Grenadilla), the berry of which is edible.]

TURNERACEÆ.

353. Turnera ulmifolia, L.

Fl. March–Oct. In waste places, common.—All islands.

354. T. parviflora, Benth.

Fl. Sept.–Dec. and Jan.–May. Leaves always eglandular; calyx not tomentose. Gregarious on rocky seashores, rare.—St. Thomas (Cowell's Hill); Buck Island, near St. Thomas.

CACTACEÆ.

355. Mamillaria nivosa, Link (Pfeiffer Enum. Cact. 1837, p. 11) (*M. tortolensis*, Hort. Berol.).

Fl. all the year round. Flower pale yellow; berry clavate, purple. Seeds brownish. On rocks near the seashore.—Buck Island and Flat Cays, near St. Thomas; Tortola (Pf.).

356. Melocactus communis, DC. (v. Pope's Head).

Fl. all the year round. Berry clavate, purple, ¾″ long. Seeds black, verrucose. Up to four feet high. On dry hills and rocks, especially near the shore.—All islands.

357. M. atrosanguineus, Hort. Berol.

St. Thomas (Pf. l. c. p. 44).

358. Cereus floccosus, Hort. Berol. (v. Dildo).

Fl. Oct.–July. Berry depressed globose, dark crimson, 1½″ diam. Pulp red; seeds small, black. On dry hills in thickets, common.—All islands.

359. C. armatus, Otto.

St. Thomas (Pf. l. c. p. 81).

360. C. triangularis, Haw. (v. Chigger-apple).

Fl. July. Berry large, crimson, edible, 5″ long, oval. On trees and rocks in forests, not uncommon.—All islands.

361. C. grandiflorus, Haw. (v. Nightblooming Cereus).

Fl. May–July. Naturalized in gardens and near dwellings.—St. Croix; St. Thomas.

362. Opuntia curassavica, Mill. (v. Suckers).

Fl. all the year round. Berry purple, ¾″ long, clavate. Gregarious in dry localities, which are often rendered impenetrable by its presence. Very common.—All islands.

363. O. Tuna, Mill. (v. Prickly Pear).

Fl. all the year round. Berry ovate, crimson, edible. Seeds small, black. Used for fencing purposes. In dry localities, very common.—All islands.

364. O. horrida, Salm. (v. Bull-suckers).

Fl. all the year round. Flower reddish-yellow. In dry localities, common.—St. Croix; St. Thomas.

365. O. spinosissima, Mill.

Fl. all the year round. Spines white, 5–8 in each cluster, deciduous on the stem. Flower ¾″ diameter. Plant reaching 20′–25′ high. In dry thickets, common.—All islands.

366. O. tuberculata, Haw. (v. French Prickly Pear).

Fl. the whole year. Flower small, yellow. Branches used for poultices. Plant 10′–15′ high. Naturalized and planted near dwellings.—St. Croix; St. Thomas.

367. O. coccinellifera, Mill.

Fl. all the year round. Plant 15′–20′ high. On limestone, uncommon.—St. Croix; St. Thomas.

368. O. catocantha, Hort. Berol.

St. Thomas (Pf. l. c. p. 166).

369. Pereskia aculeata, Mill. (v. Surinam Gooseberry).

Fl. July. Fruit acidulous, edible. Naturalized and cultivated.—St. Croix; St. Thomas.

370. P. Bleo, HB. K.

Fl. all the year round. Sepals accrescent on the fruit. Naturalized and cultivated in gardens.—St. Croix; St. Thomas.

[Cultivated species: *Cereus peruvianus*, Tabem.; *C. monoclonos*, DC.; *C. repandus*, Haw., and *C. Phyllanthus*, DC.]

CRASSULACEÆ.

371. Bryophyllum calycinum, Salisb. (v. Wonderful Leaf).

Fl. Jan.–March.—Naturalized in dry localities, common, gregarious.—All islands.

ARALIACEÆ.

372. Panax speciosum, Willd. (Spec. Plant. iv, p. 1126).

Not seen flowering. Leaflets 8, of unequal size, the central ones largest. Margin slightly undulate and denticulate. Upper surface covered with distant and deciduous muricate hairs; tomentum on the lower surface deciduous. A low tree. In forests, very rare. St. Jan (King's Hill, 1000′, on the northern slope of the hills). (Cuba, Porto Rico, Caracas.)

UMBELLIFERÆ.

373. Eryngium fœtidum, L.

Fl. Sept.–May. Biennial. Along rivulets and in moist places, rare. —St. Thomas (Caret Bay).

374. Anethum graveolens, L. (v. Dill).

Fl. March–Oct. Naturalized along roads and near dwellings.—All islands.

[Cultivated species: *Petroselinum sativum*, Hoffm. (v. Parsley); *Daucus Carota*, L. (v. Carrot); *Pimpinella Anisum*, L. (v. Anise); *Fœniculum vulgare*, Gærtn. (v. Fennel); *Anthriscus cerefolium*, L. (v. Chervil), and *Apium graveolens*, L. (v. Celery).]

LORANTHACEÆ.

375. Loranthus emarginatus, Sw. (v. Baas-fram-boom).

Fl. all the year round. Inflorescences uniserial. On trees, especially *Acacia Lebbek* and *Pisonia subcordata*. Common.—All islands.

376. Phoradendron flavens, Gris.

Fl. April–June. Seed compressed, green, with white bands. On *Pisonia subcordata*, rare.—St. Croix (Stony Ground).

CAPRIFOLIACEÆ.

[Cultivated occur: *Sambucus nigra*, L. (Fl. April–July), and *Lonicera Caprifolium*, L. (v. Honey-suckle).]

RUBIACEÆ.

377. Genipa americana, L.

Fl. July. In forests on high hills, rare.—St. Thomas (Crown); St. Jan (Rogiers).

378. Catesbæa parviflora, Sw.

Fl. Sept.–Dec. Fruit black, shining. In dry thickets, uncommon.—St. Croix (Fair Plain).

379. Randia aculeata, L. *α*) and *β*) **mitis.**

Fl. April–July. *α*) in dry thickets, *β*) in shady valleys. Common.—All islands.

380. Hamelia patens, Jacq.

Fl. all the year round. 6′–15′ high. In shady valleys, not uncommon.—All islands.

381. H. lutea, Rohr.

Fl. all the year round. In forests, uncommon.—St. Croix; St. Thomas.

382. Gonzalea spicata, DC.

Fl. May–Oct. In pastures on high hills, above 1000′, not uncommon.—Virgin Islands.

383. Exostemma caribæum, R. S. (v. Black Torch).

Fl. June–Dec. Common in thickets.—All islands.

384. Portlandia grandiflora, L.

Fl. June–Dec.—St. Thomas (DC. Prodr. iv, p. 405; Gris. Fl. p. 324); St. Croix (cultivated).

385. Rondeletia pilosa, Sw.

Fl. all the year round. In thickets.—St. Croix (rare, near Cane Bay); Virgin Islands (common).

386. Oldenlandia corymbosa, L.

Fl. Feb.–March. Seeds brown, minutely verrucose. In waste places, rare.—St. Croix (Government House yard).

387. O. callitrichioides, Gris. (Pl. Wright. p. 506).

Fl. Dec. Flower expanded early in the morning and late in the afternoon. Gregarious among stones.—St. Croix (Government House).

388. Spigelia anthelmia, L. (v. Worm-weed).

Fl. all the year round. In open, moist localities, uncommon.—St. Croix; St. Thomas.

389. Guettarda scabra, Lam.

Fl. June–Dec. Flower expanded towards evening. Drupe dark crimson, often 1-seeded by abortion. In woods, common.—All islands.

390. G. parvifolia, Sw.

Fl. July–Oct. In woods, not uncommon.—All islands.

391. Stenostomum lucidum, G.

Fl. Dec.–April. In forests, rare.—St. Croix; St. Thomas (Signal Hill).

392. Chione glabra, DC.

Not seen flowering. In forests, rare.—St. Croix (Fair Plain); St. Thomas (Soldier Bay).

393. Scolosanthus versicolor, Vahl.

Fl. Oct.–Dec. Pedicels often transformed into spines, as mentioned by DC. (Prodr. iv, 484). Leaves 2‴–3‴ long.—St. Croix (West and Ryan in Hb. Havn.); St. Thomas (rather common in thickets); Water Island.

394. Erithalis fruticosa, L. *α*) and *β*) **odorifera**, Jacq.

Fl. Oct.–March. Along the coast, not uncommon.—All islands.

395. Chiococca racemosa, Jacq.

Fl. March–Dec. In forests, common.—All islands.

396. Ixora ferrea, Benth.

Fl. Feb.–May and Nov.–Dec. Among rocks on high hills over 1200′, not uncommon.—St. Thomas (Crown).

397. Coffea arabica, L. (v. Coffee-tree).

Fl. May–July. Berry ripe Nov.–Dec. Naturalized in shady localities. Formerly cultivated on most estates on a small scale, principally in St. Jan.—All islands.

398. Faramea odoratissima, DC. (v. Wild Coffee).

Fl. June. In thickets on high hills.—St. Croix (West and Benzon in Hb. Havn.); Virgin Islands (not uncommon).

399. Psychotria glabrata, Sw.

Fl. June–Sept. Here and there in shady valleys.—All islands.

400. P. tenuifolia, Sw.

Fl. May. In thickets on high hills, rare.—St. Thomas (Crown, 1500′).

401. P. Brownei, Sprg.

Fl. June–Sept. In woods, common.—All islands.

402. P. horizontalis, Sw.

Fl. May–Dec. Along roads and in thickets, common.—All islands.

403. Palicourea Pavetta, DC. *α*) and *β*) var. **rosea**, Egg.

Fl. Feb. and Aug. *β*) corolla-lobes rosy, anthers bluish, and stem brownish. In forests, not uncommon.—*β*) all islands. *α*) St. Thomas (Signal Hill).

404. Morinda citrifolia, L. (v. Pain-killer).

Fl. June–Aug. Leaves used against headache. Naturalized in gardens.—St. Croix; St. Thomas.

405. Geophila reniformis, Cham. & Schl.

Fl. Dec.–Jan. and Aug. On the ground in dense woods, rare.—St. Thomas (Signal Hill, St. Peter); Vieques (Hb. Havn.).

406. Ernodea litoralis, Sw.

Fl. Dec.–May. Along sandy coasts, not uncommon.—All islands.

407. Diodia rigida, Cham. & Schl. (Linnæa, iii, 341).

St. Thomas (Schl.).

408. D. sarmentosa, Sw.

St. Thomas (Schl.).

409. Spermacoce tenuior, Lam. (v. Iron-grass). *α*) and *β*) **angustifolia**, Egg.

Fl. all the year round. *β*) leaves linear-lanceolate. In pastures and along roads. Both forms common.—All islands.

410. Borreria verticillata, Mey.

Fl. May–Oct. Suffruticose. In pastures on hills.—St. Croix (Hb. Havn.); St. Thomas (not uncommon on Crown).

411. B. stricta, Mey. (Primit. Fl. Essequib. p. 83).

Fl. Dec.–March. In pastures, here and there.—St. Croix (Parade Ground).

(*B. vaginata*, Ch. & Schl. (St. Thomas, Schl.), is a doubtful species (DC. Prod. iv, 551).)

412. B. parviflora, Mey.

Fl. March–June. Along roads and in forests.—St. Croix (Benzon in Hb. Havn.); St. Jan (Rustenberg, not uncommon).

[Cultivated species: *Ixora Bandhuca*, Roxb. (v. Burning Love), and *I. stricta*, Roxb.]

SYNANTHEREÆ.

413. Sparganophorus Vaillantii, G.

Fl. March–Sept. In moist localities, not uncommon.—St. Croix; St. Thomas (DC. Prod. v, 12).

414. Vernonia arborescens, Sw. *α*) **Swartziana**, *β*) **Lessingiana**, *γ*) **divaricata**, Sw.

Fl. May–Dec. In thickets, all three forms not uncommon.—All islands.

415. V. punctata, Sw.

Fl. all the year round. In thickets, common.—All islands.

416. V. Thomæ, Benth. (Vid. Medd. fra Nat. For. 1852, p. 66).

Fl. all the year round. In thickets, not uncommon.—St. Thomas.

417. Elephantopus mollis, Kth.

Fl. March–May. Head 4-flowered. In pastures, here and there.—All islands.

418. Distreptus spicatus, Cass.

Fl. Jan.–March. In pastures and along roads, common.—All islands.

419. Ageratum conyzoides, L.

Fl. Dec.–June. Achenium usually 4-gonous. Along roads and ditches, common.—All islands.

420. Hebeclinium macrophyllum, DC.

Fl. June–Sept. Achenium black, 3-gonous. In forests.—St. Croix (rare; Caledonia, Wills Bay); St. Thomas (not uncommon).

421. Eupatorium odoratum, L. (v. Christmas-bush).

Fl. Nov.–March. Along roads and in thickets, common.—All islands.

422. E. repandum, W.

Fl. Dec.–July. On hills, not common.—All islands.

423. E. atriplicifolium, Vahl (Symb. Bot. iii, 96).

Fl. Dec.–May. Leaves coriaceous, glabrous; glandular impressions numerous on the upper surface. Flower odorous. On sandy shores, common.—All islands.

424. E. canescens, Vahl.

Fl. Oct.–Nov. In thickets, uncommon. St. Croix (Spring-gut); St. Thomas (DC. Prod. v, 155).

425. E. Ayapana, Vent.

St. Croix (naturalized sec. Vahl, who received it from Pflug; probably only cultivated).

426. E. cuneifolium, Willd.

St. Thomas (DC. Prod. v, 177).

427. Mikania gonoclada, DC.

Fl. Dec.–March. In forests.—St. Croix (rare; Caledonia); Virgin Islands (not uncommon).

428. Erigeron cuneifolius, DC. (Prod. v, 288).

Fl. Dec.–July.—Rhizome perennial, for which reason this species must be considered sufficiently distinct from the annual *E. Jamaicensis*, Sw. The two species are united into one by Prof. Grisebach in his Fl. p. 365. In pastures on high hills, not uncommon above 1200′.—Virgin Islands.

429. E. spathulatus, Vahl.

Fl. April–July. Along roads and ditches, rather common.—All islands.

430. E. canadensis, L.

Fl. June–Nov. Ray-flowers often ligulate. Along roads, common.—All islands.

431. Baccharis Vahlii, DC. (Prod. v, 411) (*B. dioica*, Vahl).

Fl. all the year round. As much as 30′ high. On rocky seashores, gregarious, not uncommon. (The specific name of DC. is to be preferred to that of Vahl, notwithstanding the priority of the latter, for the reasons stated in the Prodromus.)—St. Croix (northwestern coast).

432. Pluchea odorata, Cass. (v. Sweet Scent, Ovra bla).

Fl. Feb.–April. Leaves used as tea against colds and as diuretic medicine. In moist localities, not uncommon.—All islands.

433. P. purpurascens, DC.

Fl. all the year round. Along rivulets, not uncommon.—St. Croix (Gallows Bay, Kingshill Gut).

434. Pterocaulon virgatum, DC.

Fl. all the year round. On dry hills, common.—All islands.

435. Melampodium divaricatum, DC. (Prod. v, 520) (*M. paludosum*, Kth.).

Fl. Oct.–Feb. Along ditches, gregarious, rare.—St. Croix (Jolly Hill).

436. Ogiera ruderalis, Gris.

Virgin Islands (Gris. Fl. p. 369).

437. Acanthospermum humile, DC.

Fl. all the year round. Leaves not glandular beneath. A common weed along roads.—St. Thomas.

438. Xanthium macrocarpum, DC. (Prodr. v, 523) (*X. orientale*, L.).

Fl. Oct.–Feb. A common weed, naturalized around dwellings.—All islands.

439. Parthenium Hysterophorus, L. (v. Mule-weed, White-head-broom).

Fl. all the year round. A very common weed everywhere.—All islands.

440. Ambrosia artemisiæfolia, L. *β*) **trinitensis.**

Fl. Sept.–Oct. Naturalized in waste places.—St. Croix (Fredrikssted).

441. Zinnia multiflora, L. (v. Snake-flower).

Fl. Feb.–Aug. Along roads, not uncommon.—Virgin Islands.

442. Z. elegans, Jacq.

Fl. May–Oct. Naturalized in gardens.—All islands.

443. Eclipta alba, Hassk.

Fl. June–Feb. In moist localities, not uncommon.—All islands.

444. Borrichia arborescens, DC.

Fl. all the year round. On sandy shores, gregarious.—St. Croix (common); St. Thomas (Smith's Bay).

445. Wedelia carnosa, Rich.

Fl. June–Jan. Along ditches, gregarious.—St. Croix (western part of the island, not uncommon).

446. W. buphthalmoides, Gris. (v. Wild Tobacco). *a*), *β*) **antiguensis**, Nichols, and *γ*) **dominicensis**.

Fl. all the year round. Leaves delicately fragrant. *a*) rare; *β*) and *γ*) common along roads and in thickets.—All islands.

447. W. affinis, DC. (Prod. v, 541) (*W. calycina*, Rich.).

St. Thomas (Wydler).

448. W. acapulensis, HB. K.

St. Thomas (Schl. in Linnæa, 1831, 727).

(Grisebach, Fl. 372, thinks these two species to be included probably in *W. frutescens*, Jacq.)

449. W. cruciana, Rich.

St. Croix (DC. Prodr. v, 542).

450. W. discoidea, Less. (Linnæa, 1831, 728).

St. Thomas (Less. l. c.).

451. Melanthera deltoidea, Rich.

St. Thomas (Less.).

452. Sclerocarpus africanus, Jacq. (Icon. Rar. i, t. 176).

Fl. Nov.–Dec. Along roads and in thickets, rare. (Naturalized?)—St. Thomas (Parade ground).

453. Bidens leucanthus, W.

Fl. Sept.–Dec. Under trees, on high hills.—St. Croix (West, p. 303); Virgin Islands (common).

454. B. bipinnatus, L.

Fl. Sept.–March. Achenium often 5-aristate. In pastures and along ditches, common.—All islands.

455. Cosmos caudatus, Kth.

Fl. Dec.–March. Along roads and in fields, not uncommon.—All islands.

456. Verbesina alata, L.

Fl. Feb.–Aug. Naturalized in gardens.—St. Croix; St. Thomas.

457. Synedrella nodiflora, G. (v. Fatten barrow).

Fl. all the year round. A common weed everywhere.—All islands.

458. Pectis punctata, Jacq.

Fl. Oct.–March. In pastures and along ditches, common.—All islands.

459. P. linifolia, Less.

St. Thomas (Less. Gris. Fl. p. 378).

460. P. humifusa, Sw.

Fl. all the year round. Gregarious on rocks and between stones, not uncommon.—All islands.

461. Egletes domingensis, Cass. *a*) **glabrata,** DC.; *β*) **carduifolia,** DC.; *γ*) **genuina.**

Fl. all the year round. On the sandy seashore, *a*) and *γ*) rather common. *β*) found by Oersted (Vid. Medd. 1852, p. 106).—St. Thomas.

462. Erechthites hieracifolia, Raf. *a*) and *γ*) **cacaloides,** Less.

Fl. all the year round. In moist localities, not uncommon.—St. Croix (*γ*); St. Thomas (*a*).

463. Emilia sonchifolia, DC.

Fl. Jan.–Oct. In shady localities. Naturalized, common.—All islands.

464. E. sagittata, DC. (Prodr. vi, 302) (*Cacalia coccinea,* Sims.).

Fl. all the year round. Naturalized in gardens.—St. Croix; St. Thomas.

(*Cacalia coccinea,* Sims., is, according to DC. Prodr. vi, 332, a synonym for *Emilia coccinea.* This latter species does, however, not occur in the Prodromus at all, and on a former page, 302, the *Cacalia* of Sims. is given as synonymous with *E. sagittata.*)

465. Leria nutans, DC.

Fl. June–March. In shady localities on hills, not uncommon.—All islands.

466. Brachyrhamphus intybaceus, DC. (Jacq. Icon. Rar. i, t. 162).

Fl. all the year round. Near dwellings and in waste places, a common weed.—All islands.

467. Sonchus oleraceus, L. (v. Wild Salad).

Fl. all the year round. Achenium mostly 4-furrowed. Along roads and near dwellings, common.—All islands.

(*Chrysogonum dichotomum,* sp. nov., Vahl, mentioned in West, p. 303, as occurring in St. Croix, is not described in any of Vahl's publications;

and as no specimens are to be found in Hb. Havn., I have not been able to identify the species.)

[Cultivated species: *Helianthus annuus*, L. (v. Sunflower); *Pyrethrum indicum*, Cass.; *Aster chinensis*, L.; *Tagetes patula*, L.; *Tithonia speciosa*, Hook.; *Georgina variabilis*, Willd., and *Lactuca sativa*, L. (v. Salad).]

LOBELIACEÆ.

468. Isotoma longiflora, Prsl.

Fl. all the year round. The whole plant is poisonous. In shady localities and in pastures on high hills. St. Croix (rare, Mount Pleasant, Wills Bay); Virgin Islands (rather common on the hills).

GOODENOVIACEÆ.

469. Scævola Plumieri, L.

Fl. Jan.–April. On sandy shores.—St. Croix (not uncommon); St. Thomas (Smith's Bay).

MYRSINACEÆ.

470. Ardisia coriacea, Sw.

Fl. June–Aug. Leaves minutely spotted beneath. In forests and on high hills, not uncommon.—All islands.

471. Jacquinia armillaris, L. *α*) and *β*) **arborea**, V. (v. Bay Sallie).

Fl. Sept.–Feb. On the rocky shore, not uncommon.—All islands.

SAPOTACEÆ.

472. Chrysophyllum Cainito, L. (v. Star-apple).

Fl. May–July. Fruit edible. In forests, rare.—St. Croix (Springfield); St. Thomas (Signal Hill).

473. C. pauciflorum, Lam.

Fl. June. In forests, uncommon.—St. Thomas (Flag Hill).

474. C. oliviforme, Sw. *β*) **monopyrenum**.

Fl. July. In forests, not very common.—St. Croix; St. Thomas.

475. C. microphyllum, Jacq. (v. Palmér).

Fl. Sept.–Jan. In wooded valleys, rare.—St Croix (Bugby Hole); St. Thomas (Santa Maria Gut).

476. C. glabrum, Jacq.

Fl. Sept.–Dec. and March–July. In woods and thickets, common.—All islands.

477. Sapota Achras, Mill. (v. Mespel).

Fl. Sept.–Oct. and March. Fruit sweet, edible. In forests and cultivated, common.—All islands.

478. S. Sideroxylon, Gris. (v. Bully wood).

Not seen in flower. A tall tree, affording a splendid purple, very hard timber. In forests, rare.—St. Jan (Baas Gut).

479. Sideroxylon Mastichodendron, Jacq. (v. Mastic).

Fl. Aug.–Sept. An excellent timber tree. In forests, rare.—St. Croix (Lebanon Hill); St. Thomas (Northside Bay); St. Jan (Baas Gut) (Montserrat, Ryan in Hb. Havn.).

480. Dipholis salicifolia, DC.

Fl. Feb.–March. In thickets and forests.—St. Croix (not uncommon in the western part of the island); St. Jan (Klein Caneel Bay).

481. Bumelia cuneata, Sw. (v. Break-bill).

Fl. Feb.–April. Branches often transformed into long spines. Very good timber tree. Along the coast principally in marshy soil, not uncommon.—All islands.

482. Lucuma multiflora, DC. (*Achras macrophylla*, Vahl in Hb. Havn.).

Fl. June–July and Dec.–Jan. Leaves as much as 1½′ long.—St. Croix (Hb. Havn. from Wills Bay); St. Thomas (here and there in forests; Signal Hill, 1500′).

STYRACEÆ.

483. Symplocos martinicensis, Jacq.

Fl. March–Aug. In forests on high hills. Flowers fragrant.—St. Thomas (Signal Hill above 1200′, not uncommon).

EBENACEÆ.

484. Macreightia caribæa, A. DC.

Vieques (Duchassaing sec. Gris. System. Unters. p. 91).

OLEACEÆ.

485. Linociera compacta, R. Br.

Fl. May–Oct. In forests, rather common.—St. Croix; St. Thomas.

486. Forestiera porulosa, Poir. *α*) **and** *β*) **Jacquinii**, Egg. (Jacq. Ic. Rar. t. 625).

Fl. Feb. and Sept.–Oct. In thickets near the coast, uncommon.—*α*) St. Thomas (Cowell's Hill); *β*) St. Croix (northern shore near Claremont).

JASMINACEÆ.

487. Jasminum pubescens, W. (v. Star Jessamine).

Fl. all the year round. Naturalized in gardens.—All islands.

[Cultivated species: *J. officinale*, L.; *J. revolutum*, L. (v. Nepaul Jessamine), and *Nyctanthes Sambac*, L. (v. Double Jessamine).]

APOCYNACEÆ.

483. Thevetia neriifolia, Juss. (v. Milk-bush).

Fl. all the year round. Wood employed for building boats. In thickets on dry hills, common.—All islands.

489. Rauwolfia nitida, L. (v. Milk-tree).

Fl. all the year round. In forests and thickets, common.—All islands.

490. R. Lamarckii, A. DC. (v. Bitter-bush).

Fl. all the year round. On dry hills, common.—All islands.

491. Nerium Oleander, L. (v. Nerium).

Fl. all the year round. Naturalized in gardens and near dwellings. Common.—All islands.

492. Tabernæmontana (citrifolia, Jacq.†).

Fl. June–Aug. In thickets, here and there.—St. Thomas (Frenchman's Bay).

493. Vinca rosea, L. (v. Church-flower).

Fl. all the year round. Near houses and on waste places, very common.—All islands.

494. Plumieria rubra, L. (v. Red Franchipani).

Fl. all the year round. Naturalized near dwellings.—All islands.

495. P. obtusifolia, L. (v. White Franchipani).

Fl. all the year round. Naturalized in gardens.—All islands.

496. P. alba, L. (v. Snake-root, Klang hout).

Fl. all the year round. On rocks near the shore and in dry thickets, common.—All islands.

497. Echites agglutinata, Jacq.

Fl. July–Aug. In thickets, rare.—St. Croix (Cane Bay); St. Thomas (Flag Hill).

498. E. circinalis, Sw.

Fl. Dec. In forests, rare.—St.Thomas (Flag Hill).

499. E. nerlandra, Gris.

Fl. Oct.–Jan. Here and there in thickets, not uncommon.—All islands.

500. E. suberecta, Jacq.

Fl. May–Aug. In thickets, uncommon.—St. Thomas (Cowell's Hill); St. Croix (West, p. 277).

501. E. barbata, Desv.

St. Croix; St. Thomas (DC. Prodr. viii, 453).

[Cultivated species: *Allamanda cathartica*, L., and *Tabernæmontana capensis*, L. (v. Cape Jessamine).]

ASCLEPIADACEÆ.

502. Metastelma parviflorum, R. Br.

St. Thomas (Duchass).

503. M. Schlechtendalii, Decs. (*M. albiflorum*, Gris.).

Fl. all the year round. In dry thickets, very common.—All islands.

(The specific distinction of Grisebach's species does not seem to be sufficiently permanent to justify a separation into two.)

504. Asclepias curassavica, L. (v. Wild Ipecacuana).

Fl. all the year round. Root used as an emetic. Along roads and ditches, common.—All islands.

505. A. nivea, L.

St. Thomas (Gris. Fl. 419).

506. Sarcostemma Brownei, Mey.

St. Thomas (West, p. 278, as *Asclepias viminalis*, Sw.).

507. Calotropis procera, R. Br. (v. Silk Cattún).

Fl. all the year round. Naturalized in dry localities, common.—All islands.

508. Ibatia muricata, Gris.

Fl. all the year round. In dry thickets, common.—All islands.

509. Fischeria scandens, DC.

Fl. Aug. In forests, rare.—St. Croix (Spring-gut).

[Cultivated species: *Hoya carnosa*, R. Br. (v. Wax-flower) and *Stephanotis floribunda*, A. Brongn.]

CONVOLVULACEÆ.

510. Ipomæa bona-nox, L.

Fl. Oct.–May. Naturalized in gardens.—St. Croix; St. Thomas.

511. I. Tuba, Don.

Fl. all the year round. On shrubs near the coast, uncommon.—All islands.

512. I. tuberosa, L.

Fl. Feb.–March. In forests, rare.—St. Croix (Bugby Hole); St. Thomas (Schl.).

513. I. dissecta, Pursh (v. Noyau Vine).

Fl. Nov.–May. Corolla-tube purple inside. The whole plant has a taste of prussic acid, and is used for the preparation of a liquor called Noyau. On fences and along roads, common.—All islands.

514. I. pentaphylla, Jacq.

Fl. Dec.–March. In thickets and along ditches.—St. Croix; St. Thomas.

515. I. quinquefolia, Gris.

Fl. Dec.–Jan. Corolla expanded from 8 A. M. to 3 P. M. In pastures and low thickets, common.—St. Thomas.

516. I. Batatas, Lam. (v. Sweet Potato). *α*), *β*) **leucorrhiza**, and *γ*) **porphyrorhiza**.

Fl. all the year round. Propagated by cuttings. A common vegetable. Cultivated and naturalized everywhere.—All islands.

517. I. fastigiata, Swt. *α*).

Fl. Oct.–Jan. In thickets, not uncommon.—St. Thomas.

518. I. violacea, L. (v. Granni Vine).

Fl. Dec.–Feb. Coralla expanded towards evening. In forests and along rivulets, not uncommon.—All islands.

519. I. carnea, Jacq.

St. Croix (Wills Bay sec. West, p. 272).

520. I. leucantha, Jacq. (Icon. Rar. ii, t. 318).

Fl. March–May. Capsule pilose; roots tuberous. On dry hills, not uncommon —St. Jan (near Klein Kanelbay).

521. I. triloba, L. *α*) and *β*) **Eustachiana**, Jacq.

Fl. Sept.–March. Corolla expanded till 10 A. M. Both forms in moist localities, not uncommon.—St. Croix; St. Thomas.

522. I. umbellata, Mey.

Fl. Jan.–March. Along rivulets and ditches, common.—All islands.

523. I. pes-capræ, Sw. (v. Bay Vine).

Fl. all the year round. Corolla sometimes white. On sandy seashores, very common.—All islands.

524. I. asarifolia, R. S.

Danish islands (Gris. Fl. p. 471).

(As this species is a native of Senegal, I doubt the correctness of the above habitat.)

525. I. quinquepartita, R. S. (*Conv. ovalifolius*, West (non Vahl) sec. DC. Prodr. ix, 367).

St. Croix (West, p. 271).

526. I. triquetra, R. S. (*Conv. triqueter*, Vahl, Symb. Bot. iii, 32).

St. Croix (West, p. 271); St. Thomas (Schl.).

527. I. repanda, Jacq.

Fl. Feb.–March. Leaves heteromorphous, often 2–4-lobed. Tubers large, a favourite food for wild hogs. In forests, uncommon.—St. Thomas (Flag Hill); St. Jan (Macumbi).

528. I. filiformis, Jacq.

Fl. Oct.–April. In thickets, often near the shore, not uncommon.—St. Croix; St. Thomas.

529. I. arenaria, Steud.

Fl. Dec.–April. Stem woody, as much as $\frac{3}{4}''$ diam. Root large, tuberous. Flowering partly precocious. On dry hills, in thickets, not uncommon.—All islands.

530. I. Quamoclit, L. (v. Sweet William).

Fl. all the year round. Near dwellings and along roads, common.—St. Croix; St. Thomas.

531. I. coccinea, L. (*I. hederæfolia*, L.).

Fl. Dec.–March. In thickets, common.—All islands.

532. I. Nil, Rth. (Bot. Mag. t. 188) (v. Morning-glory).

Fl. Oct.–March. Corolla expanded till 9 A. M. Along ditches and near dwellings, common.—All islands.

533. I. purpurea, Lam.

Fl. Oct.–Feb. Naturalized in gardens.—St. Croix; St. Thomas.

534. I. acuminata, R. S.

Fl. Nov.–March. Corolla crimson, as stated in Symb. Bot. iii, 26. Near rivulets, on trees, rare.—St. Croix (Golden Rock).

535. I. tiliacea, Choia.

St. Thomas (Schl.).

536. Jacquemontia tamnifolia, Gris.

Fl. Dec.–Feb. Seeds glabrous, greyish. In thickets, common.—All islands.

537. Convolvulus pentanthus, Jacq. (*Jacquemontia violacea*, Chois.).

Fl. Aug.–Dec. In thickets, on hills, common.—All islands.

538. C. jamaicensis, Jacq.

Fl. Dec.–Feb. In thickets, on the sandy seashore, rare.—St. Croix (Sandy Point); St. Thomas (Cowell's); Water Island.

539. C. nodiflorus, Desr. (*C alliflorus*, West) (v. Clashi-mulat).

Fl. Oct.–March. Common in thickets.—All islands.

540. C. melanostictus, Schl. (Linnæa, vi, 737).

St. Thomas (Schl.).

541. C. sagittifer, HB. Kth.

St. Thomas (Schl.).

542. Evolvulus linifolius, L.

Fl. Dec.–April. In moist localities, here and there.—All islands.

543. E. mucronatus, Sw.

Fl. Dec.–March. In marshy soil, not uncommon.—All islands.

544. E. nummularius, L.

Fl. Nov.–March. Among rocks in shady localities, not uncommon.—All islands.

545. Cuscuta americana, L. (v. Love-weed).

Fl. all the year round. In dry thickets, covering shrubs and trees, often killing them. Very common.—All islands.

(West, p. 271, mentions two species, *Convolvulus matutinus* and *C. venenatus*, as occurring in St. Croix, and refers for their description to Vahl's Symb. Bot. pars 3, as spec. nov. As, however, they are not described in any of Vahl's publications, and no specimens are in existence in Hb. Havn., I am unable to say whether they are old species or new ones.)

[Cultivated species: *Ipomœa Learii*, Annal. Fl. et Pom. 1840, p. 381, and *I. Horsfalliæ*, Hook.]

HYDROLEACEÆ.

546. Nama jamaicensis, L.

Fl. March–Aug. Among stones and rocks, a common weed.—St. Croix; St. Thomas.

BORAGINACEÆ.

547. Cordia Gerascanthus, Jacq. β) **subcanescens** (v. Rosewood, Cuppar).

Fl. Oct. An excellent timber tree. In forests, not very common.—Virgin Island.

548. C. alba, R. S. (v. White Manjack).

Fl. March–Sept. In thickets and along roads, not uncommon.—St. Croix (eastern part of the island).

549. C. Sebestena, Jacq. α) (Bot. Mag. t. 794). β) **rubra**, Egg. (v. Scarlet Cordia, Fluyte boom).

Fl. all the year round. β) leaf-ribs red; calyx scarlet as the corolla. Both forms common in forests and planted near dwellings.—All islands.

550. C. Collococca, L. (v. Manjack).

Fl. March–April. Precocious. In forests, common.—All islands.

551. C. nitida, Vahl.

Fl. Jan.–Feb. and Sept.–Oct. Flowers slightly odorous. In forests, not uncommon.—All islands.

552. C. lævigata, Lam.

St. Thomas (Schl.).

553. C. sulcata, DC.

Fl. June. Leaves up to 1½′ long. In forests, not common.—Virgin Islands; St. Croix (West, p. 275).

554. C. ulmifolia, Juss. α) **ovata**, β) **ovalis**, and γ) **lineata**.

Fl. May–Aug. In dry thickets, common.—α) all islands; β) St. Thomas (Ledru); γ) St. Croix (West).

555. C. cylindristachya, Sprengl. α) **portoricensis**, Sprgl. β) **floribunda**, Sprgl. δ) **graveolens**, Kth.

Fl. all the year round. On dry hills. All three forms common.—St. Croix; St. Thomas.

556. C. martinicensis, R. S.

St. Croix (Griseb. Fl. p. 481).

557. C. globosa, Kth.

Fl. July–Sept. In thickets, not uncommon.—St. Croix; St. Thomas.

558. Beurreria succulenta, Jacq. (v. Juniper).

Fl. June–Sept. In forests and thickets, common.—All islands.

559. Rochefortia acanthophora, Gris.

Fl. June–Sept. In thickets.—St. Croix (rare, Fair Plain, Jacob's Peak); Virgin Islands (not uncommon).

560. Tournefortia gnaphalodes, R. Br. (v. Sea-lavender).

Fl. all the year round. On sandy shores, common.—All islands.

561. T. hirsutissima, L. (v. Chichery grape).

Fl. Sept.–April. Along roads and in thickets, especially on limestone, common.—All islands.

562. T. fœtidissima, L.

St. Croix (West, p. 270).

563. T. bicolor, Sw. β) **lævigata**, Lam.

Fl. May. Berry globose, white. Among rocks on high hills, rare.—St. Thomas (Crown, 1500′).

564. T. laurifolia, Vent.

St. Thomas (DC.).

565. T. volubilis, L.

Fl. May–Aug. Inflorescence extra-axillary, often transformed into a hollow, globose, muricate, green monstrosity, in which lives the larva of a dipterous insect. Common in thickets.—All islands.

566. T. microphylla, Desv.

Fl. May–Sept. In the same localities as the former, common.—All islands.

567. Heliotropium indicum, L.

Fl. all the year round. Along roads and in waste places, common.—All islands.

568. H. parviflorum, L. (v. Eye-bright).

Fl. all the year round. A common weed everywhere.—All islands.

569. H. curassavicum, L.

Fl. the whole year. On the sandy seashore, common.—All islands.

570. H. fruticosum, L.

Fl. all the year round. Up to 6′ high. On dry hills.—St. Croix (common in the eastern part); Virgin Islands (not uncommon).

[Cultivated species: *H. peruvianum*, L. (v. Heliotrope.)]

POLEMONIACEÆ.

[Cultivated in gardens: *Phlox Drummondii*, Hook.]

SOLANACEÆ.

571. Brunfelsia americana, Sw. α) and β) **pubescens** (v. Rain-tree).

Fl. May–Dec. Flowers odorous before rain. In thickets and woods, common.—Virgin Islands (cultivated in gardens in St. Croix).

572. Datura Metel, L. (v. Fire-weed).

Fl. all the year round. Flowers nocturnal. Along roads and in waste places, naturalized everywhere.—All islands.

573. D. fastuosa, L.

Fl. all the year round. Naturalized in gardens and near dwellings.—All islands.

574. D. Tatula, L.

Fl. May–Dec. Along roads, naturalized, but rare.—St. Croix (Hope).

575. D. Stramonium, L. (v. Fire-weed).

Fl. Sept.–Feb. Naturalized in waste places, common.—All islands.

576. Nicotiana Tabacum, L.

Fl. May–Nov. Used as a medicine, but not for smoking. Naturalized near dwellings.—All islands.

577. Physalis peruviana, L.

Fl. May–Nov. In fields, uncommon.—St. Thomas (Rapoon).

578. P. pubescens, L.

Fl. March–May. In shady valleys, uncommon.—St. Croix (Crequis); St. Thomas.

579. P. Linkiana, Ns.

Fl. Dec. In cultivated fields, not uncommon.—St. Thomas.

580. P. angulata, L.

Fl. Sept.–Jan. Stamens of unequal length; anthers successively dehiscent. Along roads and ditches, common.—All islands.

581. Capsicum dulce, Hort. (DC. Prodr. xiii, i, 428) (v. Sweet Pepper).

Fl. March–July. Berry oblong. Naturalized in gardens.—St. Croix; St. Thomas.

582. C. frutescens, L. (v. Bird Pepper).

Fl. Aug.–Dec. Used as a condiment. Here and there in forests and cultivated.—St. Croix; St. Thomas.

583. C. baccatum, L. (v. Small Pepper).

Fl. Aug.–Jan. In forests and near dwellings, not uncommon.—All islands.

584. C. annuum, L. (v. Pepper).

Fl. all the year round. Fruit universally used as a condiment. Cultivated and naturalized everywhere.—All islands.

585. Lycopersicum cerasiforme, Dun. (Solan. p. 113) (v. Small Trovo).

Fl. May–Sept. Berry globose, small, yellow. Not uncommon near dwellings (perhaps only naturalized). Used as a vegetable.—St. Croix; St. Thomas.

586. L. esculentum, Mill. (v. Tomato, Trovo).

Fl. all the year round. Berry used as a vegetable. Cultivated and naturalized everywhere.—All islands.

587. Solanum nodiflorum, Jacq. *α*) and *β*) **oleraceum,** Dun. (v. Lumbush).

Fl. May–Dec. Stem often prickly. In fields and in waste places, common.—All islands.

588. S. verbascifolium, L. (v. Turkey-berry).

Fl. June–Oct. In waste places, not uncommon.—Virgin Islands; St. Croix (West, p. 274).

589. S. racemosum, L. (v. Canker-berry).

Fl. all the year round. Proterandrous. In waste places, very common.—All islands.

590. S. igneum, L. (v. Canker-berry).

Fl. all the year round. Habitat of the preceding. Very common.—All islands.

591. S. bahamense, L. (*S. persicæfolium,* Dun.)

Fl. Jan.–Aug. Along coasts, not uncommon.—Virgin Islands.

592. S. lanceifolium, Jacq.

Not seen flowering. Leaves and stem very prickly. In forests, rare.—St. Jan (King's Hill, 1000′).

593. S. torvum, Sw. (v. Plate-bush).

Fl. all the year round. A shrub or small tree. In forests and near dwellings, common.—All islands.

594. S. inclusum, Gris., var. **albiflorum,** Egg.

Fl. all the year round. Corolla white, ¾″–1″ diam. Stigma 3–5-branched, stellate. Berry globose, somewhat depressed, hirsute, orange-coloured, 1″ diam. The excrescent calyx prickly. In dry thickets, not uncommon.—Virgin Islands.

595. S. aculeatissimum, Jacq.

Fl. April–May. Naturalized by mules from Montevideo.—St. Croix (Frederiksted).

596. S. mammosum, L.

St. Croix (West, p. 275).

597. S. polygamum, Vahl (v. Kakkerlakka-berry).

Fl. all the year round. In dry thickets, common.—Virgin Islands.

(In DC. Prodr. xiii, i, 197, it is stated that this species has been found in St. Croix by Wydler, which, however, appears doubtful to me. West, p. 275, only gives St. Jan as habitat, yet Vahl in his Symb. Bot. iii, 39, and after him probably Griseb. Fl. p. 443, refer to West as the authority for St. Croix as habitat.)

598. Cestrum laurifolium, L'Her.

Fl. Jan.–April. Petiole black; berry dark purple. In forests, not uncommon.—All islands.

599. C. diurnum, L.

Fl. Feb.–June. In forests, uncommon.—Virgin Islands; St. Croix (West, p. 276).

600. C. nocturnum, L.

Fl. March. In forests, rare.—St. Jan (Rogiers, Joshee Gut).

[Cultivated species: *Datura suaveolens*, HBK.; *Petunia nyctaginiflora*, Juss., and *P. violacea*, Liudl.; *Solanum Seaforthianum*, Andr., *S. tuberosum*, L. (v. Irish potato), and *S. Melongena*, L. (v. Egg-plant, Beranger).]

SCROPHULARIACEÆ.

601. Scoparia dulcis, L.

Fl. all the year round. A common weed along roads and in moist localities.—All islands.

602. Capraria biflora, L. *α*) and *β*) **pilosa** (v. Goat-weed).

Fl. all the year round. Leaves used for tea. Both forms along roads, common. *α*) in moist, *β*) in dry localities.—All islands.

603. Herpestis stricta, Schrad.

St. Thomas (Benth.).

604. H. chamædryoides, Kth.

Fl. Dec.–March. Pedicel bearing two bracteolæ at the base. The two innermost calyx-lobes setaceous. In moist localities, rare.—St. Croix (Spring-gut).

605. H. Monniera, Kth.

Fl. all the year round. Along rivulets and on the margins of lagoons, common.—All islands.

606. Vandellia diffusa, L.

St. Croix (Ryan in Hb. Havn., Vahl's Eclogue, ii, 47) (Montserrat, Ryan in Hb. Havn., "*vulgaris*").

[Cultivated species: *Maurandia Barclayana*, Lindl. (v. Fairy Ivy), and *Russelia juncea*, Zucc. (v. Madeira Plant).]

BIGNONIACEÆ.

607. Crescentia Cujete, L. (v. Calabash-tree).

Fl. all the year round. Leaves deciduous in Dec. The fruit is used for vessels. Near dwellings and in forests, common.—All islands.

608. C. cucurbitina, L. (v. Black Calabash).

Fl. March–Nov. Wood used for boat-building. In dense forests near rivulets, not uncommon.—All islands.

609. Catalpa longisiliqua, Cham.

St. Thomas (Gris. Fl. 446).

610. Tecoma Berterii, DC.

Fl. March–July. Leaves deciduous Feb.–April. In dry thickets, common.—Virgin Islands.

611. T. leucoxylon, Mart. (v. White Cedar).

Fl. March–April, precocious, and later coëtanous in Sept.–Oct. Wood used for building boats. In forests and on dry hills, common.—All islands.

612. T. stans, Juss. (v. Yellow Cedar).

Fl. all the year round. Anthers pilose beneath. In thickets, common; often gregarious, especially in St. Croix.—All islands.

613. Bignonia æquinoctialis, L.

Fl. April–Sept. Anthers pilose or glabrous (hence Vahl's distinction on this account between his *B. spectabilis* (Symb. Bot. iii, p. 80) and this species not justified). Here and there in marshy forests.—St. Thomas (Northside Bay, Sta. Maria); St. Croix (Salomon's estate, West, p. 294).

614. B. unguis, L. (v. Cat-claw).

Fl. April–May, precocious, later again coëtanous in Nov. Stem 1½″ diam., showing the irregular structure peculiar to all climbing *Bignoniaceæ*. Fruit as much as 26″ long. In forests, not uncommon.—All islands.

615. Distictis lactiflora, DC. (Prodr. ix, 191) (*Bignonia*, Vahl).

Fl. all the year round. On fences and in dry thickets, here and there.—St. Croix (Cotton Grove, Southgate Farm) (cultivated in St. Thomas).

[Cultivated species: *Tecoma capensis*, Lindl.]

ACANTHACEÆ.

616. Ruellia tuberosa, L. (v. Christmas-pride).

Fl. all the year round; most abundantly towards Christmas. Along roads and ditches, common.—All islands.

617. R. strepens, L.

St. Croix (Isert sec. DC. Prodr. xi, 121).

618. Stemonacanthus coccineus, Gris.

Fl. Jan.–April. Cleistogamous flowers in July; also an intermediate form between cleistogamous and normal flowers. In shady forests, rare.—St. Croix (Caledonia, Wills Bay); St. Jan (Bordeaux Hills); St. Thomas (Wydl. sec. DC. Prodr. xi, 217).

619. Blechnum Brownei, Juss. (v. Penguin Balsam).

Fl. Dec.–April. Used against cough. In pastures and along ditches, common.—All islands.

620. Barleria lupulina, Lindl. (Bot. Reg. t. 1483).

Fl. Dec.–April. Naturalized near dwellings and in gardens.—St. Thomas; St. Jan.

621. Thyrsacanthus nitidus, Ns.

St. Croix (v. Rohr sec. Symb. Bot. ii, 5, and Isert sec. DC. Prodr. xi, 327); St. Thomas (Nees).

622. Dianthera pectoralis, Murr. (v. Garden Balsam).

Fl. Dec.–March. Used against coughs. Naturalized near dwellings and in gardens.—All islands.

623. D. sessilis, Gris. (*Justicia pauciflora,* Vahl in Eclog. Am. i, 2).

Fl. June–July. Flowers often cleistogamous. Rhizome perennial. In thickets, here and there.—St. Croix (Salt River); St. Thomas.

624. Justicia carthagenensis, Jacq.

Fl. Dec.–March. Along ditches and in forests.—All islands.

625. J. reflexiflora, Rich. (Vahl's Enum. Plant, i, 157), var. **glandulosa,** Egg.

Fl. all the year round. Bracts densely glanduliferous. Seeds globose, brown. Procumbent among bushes.—St. Croix (rare, Fair Plain); St. Thomas; Buck Island (not uncommon).

626. J. periplocæfolia, Jacq.

St. Thomas (Schl.).

627. Beloperone nemorosa, Nees.

Fl. Jan.–March. Calyx one-sixth of the length of the corolla. In forests, rare.—St. Croix (Caledonia, Ham's Bluff Valley).

628. Crossandra infundibuliformis, Nees.

Fl. March–June. Naturalized in gardens.—St. Croix.

629. Stenandrium rupestre, Ns. (DC. Prodr. xi, 283) (*Ruellia?*, Sw. Fl. Ind. Occ. p. 1071; Plum. Icon. ed. Burm. t. 75, as *Gerardia*). *α*) glabrous, *β*) pilose.

Fl. Dec.–May, cleistogamous. Normal flowers June–Aug. Corolla expanded till 9 A. M. Rhizome perennial; roots fusiform, tuberous. Gregarious on the ground in forests, rare.—*α*) St. Thomas (Flag Hill, 700′–900′); *β*) St. Jan (Baas Gut).

630. Anthacanthus spinosus, Nees.

Fl. all the year round. Flowers heterostylous. On rocks and in forests, common, especially in St. Croix.—All islands.

631. A. jamaicensis, Gris.

Fl. June–July. Corolla-lobes glandular inside. On limestone, rare.—St. Croix, in stony ground.

632. A. microphyllus, Ns.

Fl. May–Aug. In forests, here and there.—All islands.

633. Dicliptera adsurgens, Juss.

Fl. Jan.–Feb., cleistogamous; normal, March–April. In thickets and near ditches.—St. Croix (common); St. Jan (less common).

634. Thunbergia volubilis, Pers.

Fl. all the year round. Naturalized along ditches and rivulets.—St. Croix (Caledonia, Mt. Stewart); St. Thomas (Tutu).

[Cultivated species: *Graptophyllum hortense*, Nees, *Justicia bicolor*, Andr., *Thunbergia alata*, Boj., *Th. fragrans*, Roxb., and *Sesamum orientale*, L. (v. Benye).]

GESNERIACEÆ.

635. Martynia diandra, Glox. (v. Cocks).

Fl. Sept.–Dec. Three rudimentary filaments; 1′–3′ high. Along roads and in waste places, not uncommon.—St. Croix; St. Thomas.

LABIATÆ.

636. Ocimum Basilicum, L.

Fl. May–Aug. Naturalized in gardens.—All islands.

637. O. micranthum, W. (v. Passia Balsam).

Fl. Aug.–Nov. Corolla expanded during the morning. Used against coughs. Along ditches and in pastures, gregarious.—All islands.

638. Coleus amboinicus, L. (v. East India Thyme).

Fl. April–May. Naturalized in dry localities, gregarious.—All islands.

639. Hyptis capitata, Jacq. (v. Wild Hops).

Fl. Nov.–March. Along rivulets, common.—St. Croix; St. Thomas.

640. H. suaveolens, Poit.

Fl. Oct.–Feb. 3′–4′ high. In dry localities, common.—St. Croix; St. Thomas.

641. H. pectinata, Poit. (v. French Tea).

Fl. Nov.–April. As much as 8′ high. In dry localities, not uncommon.—All islands.

642. H. verticillata, Jacq.

St. Thomas (Gris. Fl. p. 489).

643. Salvia occidentalis, Sw.

Fl. Dec.–March. Rhizome thick. Along roads, common.—All islands.

644. S. tenella, Sw.

St. Thomas (Gris. Fl. p. 490; Schl.).

645. S. serotina, L.

Fl. Sept.–April. Leaves very bitter. Corolla white. In dry localities, gregarious, common.—All islands.

646. S. coccinea, L. *α*) and *β*) **ciliata**, Benth.

Fl. all the year round. Along ditches and roads, common.—All islands.

647. Leonurus sibiricus, L.

Fl. all the year round. Corolla sometimes white. A common weed in fields and along roads.—All islands.

648. Leucas martinicensis, R. Br.

Fl. March–Nov. A weed, common in gardens and along roads.—St. Croix.

649. Leonotis nepetæfolia, R. Br. (v. Hollow Stock).

Fl. all the year round. Corolla sometimes white. Gregarious, a very common weed everywhere.—All islands.

650. Mentha aquatica, L. (v. Mint).

Not seen flowering. Naturalized along rivulets, gregarious.—St. Croix (Caledonia).

[Cultivated species: *Rosmarinus officinalis*, L. (v. Rosemary), *Thymus vulgaris*, L. (v. Thyme), and *Origanum Majorana*, L. (v. Sweet Marjoram Tea).]

VERBENACEÆ.

651. Priva echinata, Juss.

Fl. all the year round. Corolla expanded till 10 A. M. A common weed along roads and in gardens.—All islands.

652. Bouchea Ehrenbergii, Cham.

Fl. Dec.–May. Gregarious along roads and in dry localities, common.—St. Croix; St. Thomas.

653. Stachytarpha jamaicensis, V. (v. Vervain).

Fl. all the year round. Flower expanded till noon. Pollen 3–4-branched, stellate. Leaves used against fever. Very common along roads and ditches.—All islands.

654. S. strigosa, Vahl.

St. Thomas (Ehrenb. sec. DC. Prodr. xi, 564; Gris. Fl. p. 494).

655. Lippia nodiflora, Rich.

Fl. all the year round. Gregarious in moist localities, not uncommon.—St. Croix (La Reine, Fair Plain).

656. Lantana Camara, L. (v. Sage).

Fl. all the year round. Berry considered to be poisonous. On dry hills, very common.—All islands.

657. L. polyacantha, Schauer (DC. Prodr. xi, 597) (*L. scabrida*, Ait.).

Fl. all the year round. In dry localities, here and there.—St. Croix (St. George); St. Thomas (Solberg).

658. L. involucrata, L.

Fl. all the year round. Corolla and berry violet. In thickets, common, especially on limestone.—All islands.

659. L. reticulata, Pers.

Fl. all the year round. On limestone, rare.—St. Croix, in stony ground (King's Hill).

660. Citharexylum quadrangulare, Jacq. (v. Fiddlewood, Susanna).

Fl. July–Sept. In forests, not uncommon.—St. Croix; St. Thomas.

661. C. cinereum, L. (v. Susanna).

Fl. July–Dec. Leaves of both these species becoming red in Feb., and dropping off at the same time that the new ones make their appearance. On young radical shoots the leaves are linear and deeply serrate. The wood is quite useless, even for firewood. In dry thickets and forests, common, often gregarious.—All islands.

662. C. villosum, Jacq. (Icon. Var. t. 118).

St. Thomas (Schlecht., Bertero, Duchass. sec. Gris. Syst. Unt.).

663. Duranta Plumieri, Jacq.

Fl. May–Dec. Along roads and in thickets, common.—All islands.

664. Callicarpa reticulata, Sw.

St. Croix (West, p. 269).

665. Ægiphila martinicensis, Jacq.

Fl. Aug.–Jan. Flowers often heterostylous. In forests, common.—St. Croix.

666. Clerodendron aculeatum, L. (v. Chuc-chuc).

Fl. all the year round. Common on dry hills and in marshy soil.—All islands.

667. C. fragrans, W.

Fl. all the year round. Long creeping rhizome. Gregarious on high hills in shady places, naturalized.—St. Thomas (Dorothea, Liliendal).

668. Petitia domingensis, Jacq. *a*).

Fl. May–Sept. Leaves often ternate. Drupe commonly 4-loculate. A tree up to 50′ high. In forests, not uncommon.—St. Croix (Caledonia, Punch, Wills Bay).

669. Vitex divaricata, Sw.

Fl. May–July. Filaments glandular-pilose. A low tree, here and there in forests.—St. Croix (Caledonia, Wills Bay); St. Thomas (Crown); St. Jan (Cinnamon Bay).

670. Avicennia nitida, Jacq.

Fl. all the year round. Upper surface of leaves always covered with small salt crystals. Along the seashore and lagoons, common.—All islands.

671. A. tomentosa, Jacq.

St. Croix (West, p. 269); St. Thomas (Schl.).

[Cultivated species: *Verbena chamædrifolia*, Juss., in several varieties, *Petræa volubilis*, Jacq. (v. Wreath-plant), *Aloysia citriodora*, Ortega (v. Lemon-scented Verbena), *Vitex Agnus-castus*, L. (v. Wild Black Pepper), and *Holmskjoldia sanguinea*, Retz.]

MYOPORACEÆ.

672. Bontia daphnoides, L. (v. White Alling).

Fl. all the year round. On sandy shores.—St. Croix (rare, Turner's Hole); Virgin Islands (not uncommon).

PLANTAGINACEÆ.

673. Plantago major, L. β) **tropica** (v. English Plantain).

Fl. Jan.–March. Proterogynous. Leaves used against inflammation of the eyes.

PLUMBAGINACEÆ.

674. Plumbago scandens, Thunb. (v. Blister-leaf).

Fl. all the year round. Leaves used as blisters. In thickets and forests, common.—All islands.

[Cultivated species: *P. capensis*, Thunb.]

PHYTOLACCACEÆ.

675. Suriana maritima, L.

Fl. June–Dec. Stamens mostly 10. Filaments pilose. On sandy shores, not uncommon.—All islands.

676. Microtea debilis, Sw.

Fl. July–Sept. In shady places, rare.—St. Croix (Spring Garden, Wills Bay).

677. Rivina lævis, L. (v. Snake-bush, Stark mahart). α) and β) **pubescens**.

Fl. all the year round. A common weed everywhere, both forms.—All islands.

678. R. octandra, L.

Fl. Feb.–Aug. Pedicel and calyx becoming reddish-brown as well as the fruit. Stamens in two whorls, mostly 12. In thickets and forests, common.—All islands.

679. Petiveria alliacea, L. (v. Gully-root).

Fl. all the year round. A very common weed everywhere.—All islands.

CHENOPODIACEÆ.

680. Chenopodium ambrosioides, L.

Fl. March. In waste places and on walls, here and there.—St. Croix (Fredriksted); St. Jan (Cruz Bay).

681. Ch. murale, L.

Fl. Jan.–May. On walls, uncommon, naturalized.—St. Croix; St. Thomas.

682. Obione cristata, Moq. (DC. Prodr. xiii, ii, p. 110).

Fl. March–Aug. On sandy shores, uncommon.—St. Thomas (Water Bay); St. Jan; St. Croix (Schl.).

683. Boussingaultia baselloides, Kth. (Bot. Mag. t. 3620).

Fl. all the year round. Naturalized in gardens and cultivated.—St. Croix; St. Thomas.

684. Batis maritima, L.

Fl. all the year round. Gregarious along the coast of lagoons, common.—St. Croix; St. Thomas.

[Cultivated species: *Beta vulgaris*, L. (v. Red Beet).]

AMARANTACEÆ.

685. Celosia argentea, L. (*C. margaritacea*, L.).

Fl. all the year round. Naturalized around dwellings.—St. Thomas; St. Croix (West, p. 277).

686. C. nitida, Vahl.

Fl. all the year round. In forests and thickets, not uncommon.—St. Croix; St. Thomas.

687. Chamissoa altissima, Kth.

Fl. Dec.–March. In forests, here and there.—St. Croix (Lebanon Hill); St. Thomas (Signal Hill).

688. Achyranthes aspera, L. *α*) **argentea,** Lam. *β*) **obtusifolia,** Lam.

Fl. Dec.–March. In thickets and on waste places, common.—All islands.

689. Gomphrena globosa, L. (v. Bachelor's Button).

Fl. all the year round. Naturalized in gardens and near dwellings.—All islands.

690. Iresine elatior, Rich.

Fl. Sept.–March. Uppermost leaves always alternate. In thickets, common.—All islands.

691. Philoxerus vermiculatus, R. Br. (v. Bay-flower).

Fl. all the year round. Along the coast, very common, gregarious.—All islands.

692. Alternanthera polygonoides, R. Br. *c*).

Fl. all the year round. In sandy places, common.—All islands.

693. A. ficoidea, R. Br.

Fl. all the year round. In moist localities, uncommon.—St. Thomas (Haulover).

694. A. Achyrantha, R. Br.

Fl. March–Aug. Among rocks and stones, here and there.—St. Croix, St. Thomas (Schl.).

695. Amblogyne polygonoides, Raf.

Fl. all the year round: ♂ flowers very few. In sandy places near the coast, common.—St. Croix; St. Thomas.

696. Scleropus amarantoides, Schrad.

Fl. all the year round. Leaves often discoloured with white cross-stripes. In sandy localities, common.—All islands.

697. Euxolus caudatus, Moq.

Fl. all the year round. In waste places, common.—All islands.

698. E. oleraceus, Moq. (v. Lumbo).

Fl. all the year round. Near dwellings, common.—All islands.

699. Amarantus spinosus, L.

Fl. Jan.–April. Near rivulets and ditches, uncommon.—St. Croix; St. Thomas.

700. A. tristis, L.

St. Thomas (Wydler sec. DC. Prodr. xiii, ii, 260).

701. A. paniculatus, L. (v. Bower).

Fl. all the year round. A troublesome weed on account of its long tap-root. Common everywhere.—All islands.

NYCTAGINACEÆ.

702. Mirabilis Jalapa, L. (v. Four-o'clock).

Fl. all the year round. Flower expanded from 4 P. M., purple, yellow, or pink. Around dwellings, common.—All islands.

703. Boerhaavia erecta, L.

Fl. Dec.–Feb. Along ditches and in pastures, uncommon.—St. Croix (Mt. Stewart).

704. B. paniculata, Rich. (v. Batta-batta).

Fl. all the year round. Calyx often transformed into a hollow monstrosity by the larva of a wasp. A very common weed.—All islands.

705. Pisonia aculeata, L.

Fl. Feb.–April. In forests, common.—St. Croix; St. Thomas.

706. P. subcordata, Sw. (v. Mampoo, Loblolly).

Fl. April–June. Leaves partly deciduous. Wood useless for timber and fuel. Along coasts, common, growing to a large tree.—All islands.

707. P. inermis, Jacq.

Fl. April–May. Leaves on the young branches whorled. In forests, common.—All islands.

[Cultivated species: *Bougainvillea spectabilis*, Willd.]

POLYGONACEÆ.

708. Coccoloba uvifera, Jacq. (v. Sea-grape).

Fl. July–Dec. Wood hard, dark purple, used for ship-building. On the sandy seashore, common. Sometimes in the interior as high up as 1200′.—All islands.

709. C. leoganensis, Jacq.

Fl. May–July. Flowers in fascicles of 3–4, of which, however, one only bears fruit. Drupe oval, violet, 4‴ long. On sandy shores, rare.—St. Croix (Sandy Point).

710. C. rugosa, Desf. (DC. Prodr. xiv, 152; Bot. Mag. t. 4536).

St. Thomas (DC. Prodr. l. c.).

711. C. laurifolia, Jacq. (Hort. Schœnbr. iii, p. 9, t. 267).

Fl. March–July. Leaves deciduous April to May. Fruit purplish, pointed at both ends. In thickets, here and there.—St. Croix (Sandy Point, Hard Labour).

712. C. diversifolia, Jacq.

Fl. May–July. 6′–8′ high. Along the coast, uncommon.—St. Croix (La Vallée, Claremont).

713. C. obtusifolia, Jacq.

St. Croix (West, p. 281).

714. C. punctata, Jacq. *α*) **Jacquinii,** *β*) **barbadensis,** Jacq., *δ*) **parvifolia** (v. Red wood, Roehout), *γ*) **microstachya,** W.

Fl. Aug.–Dec. *α*) leaves as much as 1¾′ long. A shrub or low tree. *δ*) and *γ*) common; *α*) and *β*) uncommon.—All islands.

715. C. nivea, Jacq.

Fl. June–Sept. Flowers delicately odorous. Fruit white when ripe. In forests, not uncommon.—All islands.

(*C. Klotzschiana*, Meissn., and *C. Kunthiana*, Meissn. (DC. Prodr. xiv, 155 and 166), are said to have been found in St. Thomas, but they are both very doubtful species, founded on single specimens, and have therefore been here omitted.)

[Cultivated species: *Antigonon cordatum*, Mart. & Galeotti (v. Mexican Wreath-plant), and *Rumex vesicarius*, L.]

LAURACEÆ.

716. Cinnamomum zeilanicum, Bl.

Fl. April–May. Naturalized in a few places in shady valleys.—St. Croix (Crequis).

717. Phœbe antillana, Meissn. (DC. Prodr. xv, i, p. 31). γ) **cubensis**.

St. Croix (West in Hb. Petrop. sec. DC. l. c.).

(*Ph. montana*, Gris., said by Meissn. (DC. Prodr. l. c. p. 236) to be synonymous with *Laurus longifolia*, Vahl, mentioned by West, p. 2[illegible]2, as a new species from St. Croix, ought perhaps to be added to this list; but as the specimens seen by me in Hb. Havn. as *Laurus longifolia*, Vahl, do not agree with Grisebach's, I prefer to omit the species here, as being doubtful.)

718. Persea gratissima, Gaertn. (v. Alligator Pear).

Fl. March–May. Stamens, 9 perfect, 3 less perfect and sterile, 6 rudimentary. The fruit is a favourite vegetable. In gardens.—All islands.

719. Hufelandia pendula, Ns. (*H. Thomœa*, Nees).

St. Thomas (sec. DC. Prodr. l. c. p. 65, Hb. Kunth!).

720. Acrodiclidium salicifolium, Gris.

Fl. May–Aug. In forests, here and there.—St. Croix (Wills Bay, Spring-gut).

721. Nectandra coriacea, Gris.

Fl. May–Aug. In forests, rare.—St. Thomas (Soldier Bay); St. Jan (Hb. Havn.).

722. N. membranacea, Gris.

Fl. June. In dense forests, uncommon.—St. Croix (Wills Bay); St. Thomas (Signal Hill).

723. N. antillana, Meissn. (DC. Prodr. l. c. 153) (*N. leucantha*, Gris.).

Fl. May–June. In forests, not uncommon. Fragrant.—All islands.

724. Oreodaphne leucoxylon, Nees.

Fl. July. In dense forests on high hills, uncommon.—St. Thomas (Signal Hill) (Montserrat, Ryan in Hb. Havn.).

725. Cassyta americana, L.

Fl. March–April. Inflorescence often branched. On Manchineel and Acacia trees along the seashore, here and there.—St. Croix (Cotton Grove); St. Thomas (Water Bay); Vieques (Hb. Havn.).

THYMELÆACEÆ.

726. Daphnopsis caribæa, Gris.

Fl. July and Dec.–March. In forests, not uncommon.—St. Thomas (Flag Hill, Signal Hill).

EUPHORBIACEÆ.

727. Buxus Vahlii, Baill. (DC. Prodr. xvi, i, p. 16) (*Tricera lævigata*, Sw., var. *Sanctæ-Crucis*, Eggers in Fl. St. Crucis, p. 111).

Fl. June–Oct. On limestone, rare.—St. Croix (Stony Ground).

728. Savia sessiliflora, W. (Spec. Plant. iv, p. 771).

Fl. June–Dec. In thickets on dry hills, not uncommon.—All islands.

729. Phyllanthus acuminatus, Vahl (Symb. Bot. ii, 95).

St. Thomas (Herb. DC. sec. DC. Prodr. xv, ii, 381). Vahl, however, gives only Cayenne (Rohr) as habitat.

730. Ph. Niruri, L. (v. Creole Chinine).

Fl. all the year round. Very common in gardens and along roads.—All islands.

731. Ph. distichus, Müll. (DC. Prodr. l. c. 413) (*Cicca*, L.) (v. Gooseberry).

Fl. June–Sept. Fruit used for preserves. Naturalized near dwellings.—All islands.

732. Ph. nobilis, Müll. (l. c. 415). *η*) **Antillana** (*Cicca*, Juss.) (v. Gongora-hout).

Fl. July, and afterwards precocious in Dec.–Jan. In forests, not uncommon.—All islands.

733. Ph. falcatus, Sw. (v. Boxwood).

Fl. all the year round. In marshy soil, not uncommon.—Vieques.

734. Securinega acidothamnus, Müll. (l. c. 451) (*Flüggea*, Gris.).

Fl. May–June. In thickets, not uncommon.—St. Croix (eastern part of the island).

(I have adopted Müller's generic name, *Flüggea* being an older name for a genus of *Ophiopogoneæ* established by L. C. Richard.)

735. Drypetes lævigata, Gris. ined. (*Excœcaria polyandra*, Gris. Cat. Pl. Cub. p. 20, & Diagnos. neuer Euphorb. p. 180).

Fl. Sept. ♂. I have not found the female flower nor fruit, and am therefore not able to supply the deficiency in this respect in Grisebach's Diagnosis.—St. Croix (Fair Plain); St. Jan (Cinnamon Bay).

736. D. glauca, Vahl.

St. Croix (Hb. Havn. Ryan, Rohr; "Hollow berry of Bugby Hole") (Montserrat, Ryan in Hb. Havn.).

737. Croton astroites, Ait. (v. White Marán).

Fl. Dec.–July. Style 16-branched. In dry thickets, very common.—All islands.

738. C. betulinus, Vahl (Symb. Bot. ii, p. 98).

Fl. all the year round. A low shrub, brownish. Common in thickets.—All islands.

739. C. flavens, L. (v. Marán).

Fl. all the year round. Gregarious on dry hills, also as secondary growth; very common, and a troublesome shrubby weed.—All islands.

740. C. discolor, Willd. (Spec. Plant. iv, 352) (*C. balsamifer*, L.).

Fl. all the year round. Along roads in dry localities, common.—St. Croix (eastern part of the island); St. Thomas (Hb. Thunb. sec. DC. Prodr. l. c. p. 615).

741. C. ovalifolius, West.

Fl. all the year round. Along roads and in waste places, very common.—All islands.

742. C. lobatus, L.

Fl. March–Dec. In the same places as the preceding, very common.—All islands.

743. C. humilis, L.

St. Thomas (Bertero sec. DC. Prodr. l. c. 670).

(An arboreous as yet undetermined *Crotonea*, not found in blossom, occurs in a few specimens on Flag Hill in St. Thomas.)

744. Aleurites Moluccana, Willd. (Spec. Plant. iv, 590) (*A. triloba*, Forst.) (v. Walnut).

Fl. all the year round. Naturalized near dwellings and in gardens.—St. Croix; St. Thomas.

745. Ricinella pedunculosa, Müll. (Linnæa, xxxiv, 153) (*Adelia Ricinella*, L.).

Fl. March–May, precocious. Always very spiny. In dry thickets, not uncommon.—All islands.

746. Argyrothamnia fasciculata, Müll. (Linnæa, l. c. 146) (*Ditaxis*, Schl.).

Fl. Jan.–May and Sept. In thickets, not uncommon.—All islands.

747. A. candicans, Müll. (DC. Prodr. l. c. 741) (*Argythamnia*, Sw.).

Fl. Sept.–April. Capsule dark blue; seeds verrucose. In thickets, common.—All islands.

748. Acalypha chamædrifolia, Müll. (l. c. 879). β) **genuina** (*A. reptans*, Sw.), γ) **brevipes**.

Fl. all the year round; female flowers developing gradually. Bracts persistent after dissemination. On rocks and in crevices, not uncommon.—St. Croix (β); St. Thomas (γ).

749. Tragia volubilis, L. (v. Nettle, Bran-nettle).

Fl. Feb., Sept. Male flowers often transformed into a globose monstrosity. The plant is believed by the negroes to give them luck in marketing. In thickets and along roads, common.—All islands.

750. Ricinus communis, L. *a*) (v. Castor-oil tree).

Fl. all the year round. Seeds used for pressing castor-oil. Naturalized on waste places, common.—All islands.

751. Manihot utilissima, Pohl (Plant. Bras. i, 32) (v. Cassava).

Fl. March–May. Root used for manufacturing starch and flour, which is made up into flat, thin cakes (bambam). Naturalized and cultivated.—All islands.

752. Jatropha Curcas, L. (v. French Physic-nut, Skitnetchi).

Fl. all the year round. Seeds very drastic. A low tree, often planted on graves. Naturalized near dwellings, common.—All islands.

753. J. gossypiifolia, L. (v. Physic-nut). *a*) **staphysagriæfolia**, *β*) **elegans**.

Fl. all the year round. The whole plant has a disagreeable smell. Suffrutescent, 1′–4′ high. A troublesome weed near dwellings and in fields. Very common everywhere.—All islands.

754. J. multifida, L. (v. Coral-bush).

Fl. all the year round. Naturalized in gardens.—St. Croix; St. Thomas.

755. Sebastiania lucida, Müll. (DC. Prodr. l. c. 1181) (*Excœcaria*, Sw.).

Fl. Feb.–June. A shrub or low tree, 5′–20′ high. In thickets and forests, common.—All islands.

756. Hippomane Mancinella, L. (v. Manchineel-tree).

Fl. precocious, Feb.–April, coëtanous, May–June. Wood affording excellent timber, but very little used on account of the caustic milky juice. On sandy shores, often gregarious, sometimes in the interior of the islands on hills.—St. Croix (common); Virgin Islands (uncommon).

757. Excœcaria Laurocerasus, Müll. (l. c. 1202). *γ*) **laurifolia**.

Not seen flowering. A high tree; bark smooth, white. In dense forests, rare.—St. Jan (Cinnamon Bay).

758. Hura crepitans, L. (v. Sandbox-tree).

Fl. Sept. Leaves deciduous in Jan.–April. Seeds drastic. A high tree with horizontal branches and prickly stem. In forests and near dwellings, common.—All islands.

759. Dalechampia scandens, L.

Fl. Feb.–June. Male inflorescence bearing at the base two resinous corpuscula, deciduous together with the male flowers. Baillon considers them to be sterile bracts; Müller takes them for monstrous anthers. Central female flower pedicellate. In thickets, common.—All islands.

760. Euphorbia buxifolia, Lam.

Fl. all the year round. On the sandy shore, common.—All islands.

761. E. articulata, Burm.

Fl. all the year round. Along the seacoast, common.—All islands.

762. E. pilulifera, L.

Fl. all the year round. In waste places and along roads, very common.—All islands.

763. E. hypericifolia, L. *α*) and *β*) **hyssopifolia, L.**

Fl. all the year round. Leaves distichous. Used against dysentery. Same places as the preceding. A common weed.—All islands.

764. E. thymifolia, Burm.

Fl. all the year round. The whole plant reddish. Leaves folding together during night and in rainy weather. Among stones and along roads, very common.—All islands.

765. E. prostrata, Ait.

Fl. the whole year. Together with the preceding, common.—All islands.

766. E. petiolaris, Sims (Bot. Mag. t. 883) (v. Manchineel).

Fl. the whole year. Partly precocious in the spring. On dry hills and in thickets.—Virgin Islands (common); St. Croix (West, p. 288?).

(West's *E. cotinifolia*, said to occur in St. Croix, is evidently meant for this species. I doubt, however, the correctness of the habitat, and am of opinion that it is a mistake for St. Thomas, where the species is exceedingly common.)

767. E. geniculata, Ortega (Decad. p. 16; DC. Prodr. xv, ii, 72). (*E. prunifolia*, Jacq. Hort. Schœnbr. iii, t. 277, a form with larger, serrate leaves.)

Fl. Dec.–March. In forests and near dwellings, not uncommon, often gregarious.—St. Croix (Government House); St. Thomas (Signal Hill).

768. E. heterophylla, L. *β*) **cyathophora, Jacq.**

Fl. all the year round. Gregarious in dry places, common.—All islands.

769. E. neriifolia, L. (DC. Plant. Grasses, i, t. 46).

Fl. March–June. A large tree, stem 2′–3′ diam. Naturalized near dwellings, common.—All islands.

770 Pedilanthus tithymaloides, Poit. *α*), *β*) **padifolius**, Poit., and *γ*) **angustifolius**, Poit.

Fl. all the year round. In thickets and gardens, uncommon.—All islands.

All *Euphorbiaceæ* are proterogynous.

[Cultivated species: *Jatropha panduræfolia*, Andr., *Codiæum variegatum*, Müll. *α*) *pictum*, *Euphorbia pulcherrima*, W., *E. splendens*, Boj., and *E. antiquorum*, L.]

URTICACEÆ.

771. Celtis trinervia, Lam.

Fl. June–Dec. In forests and thickets, not uncommon.—All islands.

772. C. aculeata, Sw. *α*) and *β*) **serrata**.

Fl. March–Sept. Proterogynous. Both forms not uncommon in thickets.—All islands.

773. Sponia micrantha, Decs.

Fl. April–Sept. In forests, here and there.—All islands.

774. Ficus crassinervia, Desf.

Fl. Jan. In forests, not uncommon.—St. Croix (Crequis, Wills Bay).

775. F. trigonata, L.

Fl. May–Aug. In forests.—St. Croix (rare, Crequis); Virgin Islands (not uncommon).

776. F. lævigata, Vahl.

Fl. Jan.–March. In forests and on rocks, not uncommon.—St. Croix (Crequis, Jacob's Peak).

777. F. lentiginosa, Vahl.

Fl. May. In forests on high hills, uncommon.—St. Thomas (Signal Hill).

778. F. populnea, W.

Fl. July–Aug. Figs geminate in the axils, red with dark spots. On rocks and epiphytic on trees, not uncommon. Long aërial roots.—All islands.

779. F. pedunculata, Ait.

Fl. Jan.–May. Figs red, generally inhabited by a small hymenopterous insect. On rocks, walls, and trees, common. Long aërial roots.—All islands.

780. Artocarpus incisa, L. (v. Breadfruit-tree).

Fl. May–July. Fruit not edible. Naturalized in shady valleys.—All islands.

781. Cecropia peltata, L. (v. Trumpet-tree).

Fl. April–June. In shady forests, not uncommon.—All islands.

782. Maclura tinctoria, Don (v. Fustic).

Fl. June–Oct. Young shoots with deeply serrate leaves. Wood affording an excellent timber, but now very scarce. In forests, here and there.—All islands.

783. Fleurya æstuans, Gaud.

Fl. June–Dec. On rocks in shady forests, here and there.—St. Croix (Spring Garden); St. Thomas (Crown).

784. Urera elata, Gris.

St. Croix (Spring Garden, West, p. 306; his specimen in Hb. Havn.).

785. U. baccifera, Gaud.

St. Thomas (Wedd. in DC. Prodr. xvi, i, 93).

(West's *Urtica elongata*, Vahl, said, p. 306, to occur in St. Croix, and probably intended for an *Urera*, I have not been able to identify, from want of description and specimens.)

786. Pilea microphylla, Liebm. α), β) **trianthemoides,** Lindl., and γ) **succulenta** (v. Duck-weed).

Fl. all the year round. On rocks and stones in shady situations. α) uncommon; β) and γ) common.—All islands.

787. P. semidentata, Wedd.

Fl. March–July. Gregarious among rocks on high hills, not uncommon.—St. Thomas (St. Peter).

788. P. grandis, Wedd.

Fl. June. In leaf-mould on high hills, gregarious, uncommon.—St. Thomas (Crown, 1500′).

789. P. nummularifolia, Wedd.

St. Thomas (Hornbeck in Hb. Havn.); Vieques (near Campo Asilo).

790. P. inæqualis, Wedd.

Fl. July–Aug. Gregarious on rocks in forests, uncommon.—St. Thomas (Signal Hill, Crown).

791. P. Sanctæ-Crucis, Liebm. (Vid. Selsk. Skrift., v. Række, ii, 301).

St. Croix (Örsted, l. c.).

792. Rousselia lappulacea, Gaud.

St. Thomas (DC. Prodr. xvi, i, 235; Gris. Fl. p. 160).

[Cultivated species: *Ficus Carica*, L. (v. Fig-tree), and *F. elastica*, L.]

ARISTOLOCHIACEÆ.

793. Aristolochia trilobata, L. (v. Tobacco-pipe).

Fl. May–Aug. On fences and in forests on high hills.—St. Croix (West, p. 305); Virgin Islands (not uncommon).

794. A. anguicida, L. (DC. Prodr. xv, i, 464; Bot. Mag. 4361; Descourtilz, Fl. Méd. des Antilles, iii, 202) (v. Crane's Neck).

Fl. Oct.–Dec. A number of dipterous insects are usually found imprisoned in the lower part of the perigonal tube, whence escape is impossible on account of the downward-bent hairs on the inner surface. The hairs dropping off after fertilization, the imprisoned insects are set at liberty again. In thickets, rare.—St. Croix (Recovery Hill).

BEGONIACEÆ.

795. Begonia humilis, Hort. Kew. (ed. i, vol. iii, 353).

St. Thomas (Finlay in Hb. Mus. Paris. sec. DC. Prodr. xv, i, 297).

[Cultivated occur several species of Begonia.]

AMENTACEÆ.

[Cultivated in gardens and near dwellings: *Casuarina equisetifolia*, Forst. (Fl. June–Aug.) Of very quick growth.]

PIPERACEÆ.

796. Piper Sieberi, Cas. DC. (Enckea, Miq.).

Fl. all the year round. In forests; often gregarious and forming a dense underwood, common. Used for walking-sticks.—All islands.

797. P. Bredemeyeri, Jacq. (Artanthe, Miq.).

Fl. Sept. In shady valleys, not uncommon.—St. Croix (Caledonia, Crequis).

798. P. auritum, Kth.

St. Thomas (DC. Prod. l. c. 321).

799. P. Blattarum, Sprgl.

Fl. Jan.–March. In forests, rare.—St. Thomas (Crown, Signal Hill).

800. P. peltatum, L. (v. Monkey's Hand) (*Potomorphe*, Miq.).

Fl. Feb.–Aug. In forests, along rivulets, and among rocks on high hills.—St. Croix (rare, Caledonia, Springfield); Virgin islands (not uncommon on high hills).

801. Peperomia pellucida, Kth.

Fl. May–Aug. In forests, rare.—St. Croix (Rohrs Minde); St. Thomas (DC. Prod. l. c. 402).

802. P. acuminata, Miq. (*P. guadeloupensis*, Cas. DC.) (v. Stone Ginger).

Fl. all the year round. On rocks in forests, common.—All islands.

803. P. glabella, Dietr.

Fl. May–Sept. In the same places as the preceding, common.—All islands.

804. P. cubana, Cas. DC.

St. Croix (DC. Prod. l. c. 413).

805. P. obtusifolia, Cas. DC., Dietr., Miq. *α*) and *β*) **clusiæfolia.**

Fl. April–July. On rocks and under shady trees in leaf-mould. Gregarious, not uncommon. *α*) all islands; *β*) St. Thomas (Crown).

806. P. scandens, Ruiz et Pav.

St. Thomas (DC. Prod. l. c. 434).

807. P. polystachya, Miq.

Fl. Dec.–Jan. Stem and lower surface of the leaves reddish. Among rocks in forests, not uncommon, gregarious.—All islands.

B. GYMNOSPERMÆ.

CYCADACEÆ.

[Cultivated in gardens occurs *Cycas revoluta*, Thunb. (v. Sago Palm).]

CONIFERÆ.

[Cultivated in gardens occur several species of Thuja.]

C. MONOCOTYLEDONES.

ALISMACEÆ.

808. Echinodorus cordifolius, Gris.

Fl. April–Aug. Flower expanded only till 10 A. M. Leaves heteromorphous, the primordial ones submerged, linear-lanceolate, passing by degrees into the ordinary emersed ones. In rivulets, here and there.—St. Croix (King's Hill Gut, Armas Hope Gut).

HYDROCHARIDACEÆ, L. C. Rich.

809. Thalassia testudinum, Solander (Koenig).

Not seen flowering. Gregarious in shallow sea-water, very common.—All islands.

POTAMEÆ, Juss.

810. Cymodocea manatorum, Ascherson (Naturf. Freunde in Berlin, Jun.—Oct., 1868).

Not seen flowering, gregarious on the bottom of the sea; mostly in shallow water.—All islands.

811. Halodule Wrightii, Aschers. (l. c., and Neumayers Anleit. zur wiss. Beob. auf Reisen).

St. Thomas (Krebs sec. Aschers.).

812. Halophila Baillonii, Aschers. (in Neumayer, l. c. p. 367).

Rhizome creeping, thin. Leaves oval, denticulate, whorled or opposite, 3‴ long, 1½‴ broad. Monœcious.

Fl. ♂: 3 membranaceous white bracts; 1–3 stamens; filament ⅔‴ long; anther cylindrical, yellowish, glabrous, 1-celled. Pollen-grains fusiform.

Fl. ♀: 3 persistent bracts, as in ♂. Ovary sessile, ovate, ⅓‴ long, -loculate. Style bifid, 2½‴ long; branches pointed, often of unequal length. Capsule oval, glabrous, 2‴ long; seeds about 20, globose, hard, tessellate on the surface. Starch-grains triangular.

Male flowers very rare compared to the number of female ones.

Fl. all the year round. Gregarious on the bottom of the seaon coarse coral sand in a depth of from two to four fathoms, here and there.—St. Thomas (harbour).

813. Ruppia rostellata, Koch.

Fl. all the year round. Gregarious in shallow rivulets, not uncommon.—St. Croix (King's Hill Gut, in company with a species of Chara); St. Thomas (Tutu Gut, Krebs in Hb. Havn.).

[Another Potamea, possessing a creeping rhizome and delicate linear leaves, has been found by me in the harbour of St. Thomas at a depth of from 3 to 6 fathoms, but on account of only sterile specimens having been obtained it remains as yet undetermined.]

AROIDEÆ.

814. Anthurium Huegelii, Schott (v. Boyer) (*A. acaule*, Sch.).

Fl. July–March. Young radical leaves very different from the older ones, being lanceolate and long-petioled. I consider Schott's *A. acaule* not to be specifically distinct from this species. On rocks and trees, not uncommon, often gregarious.—All islands.

815. A. macrophyllum, Sch.

Fl. July-Dec. Among rocks in forests, uncommon. St. Jan (near Bethania).

816. A. cordifolium, Kth. (v. Wild Tanier, Maroon Jancole) (Bot. Mag. t. 2801, 5801 being a misprint in Gris. Fl. p. 508).

Fl. July–Nov. Among rocks in forests, gregarious, here and there.—St. Croix (Wills Bay, Blue Mountain); St. Jan (Macumbi, 1200′).

817. Dieffenbachia Seguine, Sch. (v. Dumb Cane).

Fl. May–Dec. In moist places on high hills, uncommon.—St. Thomas (Caret Bay, 1000′).

818. Philodendron hederaceum, Sch.

Fl. Aug. On trees in dense forests, rare.—St. Thomas (Crown, 1400′).

819. Ph. giganteum, Sch. (Prod. Syst. Aroid. p. 261).

Fl. March–July. Petiole 2′–2½′ long; lamina 2½′–3′ long, 2′ broad. Peduncle 1½″–3½″ long; spathe 11″–12″ long, opening itself only during two nights. Spadix white, giving out a strong odour and considerable high temperature during anthesis. Numerous aërial roots, stem 1′–2′ long. Among rocks in dense forests on high hills, gregarious on trees.—St. Thomas (Signal Hill and Crown, 1500′).

(The picture in Bot. Mag. t. 3314, of the much smaller *Ph. fragrantissimum*, Kth. (*Caladium*, Hook.), gives a good representation of the habit of this species.)

820. Caladium smaragdinum, C. Koch (Schott, l. c. 165) (v. Guinea Ginger).

Fl. May–July. Rhizome tuberous, yellow. In pastures on high hills, not uncommon.—St. Thomas (Signal Hill, above St. Peter, 1400′).

821. Xanthosoma atrovirens, C. Koch (v. Scratch-throat).

Not seen flowering. Rhizome large, tuberous, used as a vegetable. Leaves pungent when eaten as spinach. Cultivated and naturalized on provision grounds.—St. Croix; St. Thomas.

822. X. sagittæfolium, Sch. (v. Tanier).

Fl. July. Lamina of the spathe white, with a delicate rosy tinge. Spathe disclosing itself during two nights from 7 to 10 o'clock; spadix meanwhile giving forth a strong fragrance and showing a temperature of 12° C. above that of the air. Leaves used as spinach and the tuberous rhizome as a common vegetable. Cultivated and naturalized on provision grounds.—All islands.

823. X. ? hastatum, Egg. (Arum, Vahl.) (v. Indian Kale).

Not seen flowering. Leaves hastate, with long pointed oblique basilar lobes; used for spinach. (Naturalized?) Cultivated and spontaneous in forests.—All islands.

824. Pistia occidentalis, Bl.

Fl. all the year round. Cultivated and naturalized in gardens.—St. Thomas.

825. Lemna minor, L.

Not seen flowering. In rivulets, not uncommon.—St. Croix (Jealousy Gut, Fair Plain Gut).

[Cultivated species: *Caladium bicolor*, Vent., *C. pictum*, DC., and *C. picturatum*, Linden.]

TYPHACEÆ.

826. Typha angustifolia, L., var. **domingensis**, Pers.

Fl. Sept.–March. Used for making mats. In rivulets and around lagoons, not uncommon.—St. Croix; St. Jan.

PANDANACEÆ.

[Cultivated in gardens occurs *Pandanus odoratissimus*, L. fil. (v. Screw Pine).]

PALMÆ.

827. Thrinax argentea, Lodd. (v. Teyer-tree).

Fl. May–June. Stem 10′–20′ high. Leaves used for making ropes, thatching roofs, and other domestic purposes. On the northern slope of the hills in forests and tickets.—St. Croix (very rare, only one specimen seen, near Bellevue Mill); Virgin Islands (common).

828. Oreodoxa regia, Kth. (v. Mountain Cabbage).

Fl. April–Aug. The young leaf-bud used as cabbage. Berries eaten by hogs. In forests and along roads, common.—All islands.

829. Cocos nucifera, L. (v. Cocoa-nut Tree).

Fl. Feb.–March. Leaves used for thatching roofs. The ripe fruit, although occurring in abundance, is scarcely used, and of no economical importance. Naturalized along the seashore and along roads.—All islands.

COMMELYNACEÆ.

830. Tradescantia geniculata, Jacq. β) **effusa**, Mart.

Fl. March. Seeds bluish, verruculose.—Vieques (near Campo Asilo).

831. T. zebrina, Hortul. (v. Wandering Jew).

Fl. May. Naturalized in gardens.—St. Croix; St. Thomas.

832. T. discolor, Sw.

Fl. April–Aug. Stamens often by retrograde metamorphosis transformed into petals. Naturalized in waste places and near dwellings.—All islands.

833. Callisia repens, L.

Fl. Jan.–March. Gregarious in shady places, not uncommon.—All islands.

834. C. umbellulata, Lam.

Fl. Jan. Seeds white with a red spot. Flowers monandrous. Among rocks in shady places, rare.—St. Thomas (Signal Hill, 1200′).

835. Commelyna cayennensis, Rich. (French Grass).

Fl. all the year round. Flower expanded till 9 A. M. One of the sterile stamens always abortive. In moist localities, common.—All islands.

836. C. elegans, Kth. (v. French Grass).

Fl. all the year round. Flower ephemeral. In moist localities, very common.—All islands.

GRAMINACEÆ.

837. Bambusa vulgaris, Schrad. (v. Bamboo Cane).

Not seen flowering. Naturalized along rivulets and in gardens.—St. Croix; St. Thomas.

838. Arthrostylidium capillifolium, Gris. (Plant. Wright. in Mem. Amer. Acad. viii, 531, 1862).

Not seen flowering. In forests, climbing among trees and shrubs to a considerable height, rare.—St. Thomas (Flag Hill, 700′); St. Jan (Hornbeck in Hb. Havn., from "a large cataract, called Battery"); Vieques (flowering specimens from Hornbeck in Hb. Havn.; others received from Campo Asilo by me).

839. Eragrostis poæoides, P. Br.

Fl. June–Dec. Stigmas white. Along roads and in dry localities, often gregarious, common.—St. Croix; St. Thomas.

840. E. ciliaris, Lk.

Fl. March–Dec. Anthers black. In dry localities, common.—All islands.

841. Sporobolus virginicus, Kth. (v. Shander).

Fl. May–Oct. Anthers and stigmas yellow. Used in baths for children. Along the coast and lagoons, common.—All islands.

842. S. litoralis, Kth. (v. Shander).

Fl. May–Dec. In the same places as the preceding, common.—All islands.

843. S. indicus, R. Br. (v. Hair-grass).

Fl. May–Oct. Anthers purple; stigmas yellow. Along roads and ditches.—All islands.

844. Aristida stricta, Mich.

Fl. March–Dec. Anthers yellow. Awns of unequal length, always longer than the glumes. Along ditches and in thickets, here and there.—St. Croix (Crequis, Fair Plain); St. Thomas (Schl.); St. Jan (Adrian Estate).

845. Olyra latifolia, L. *β*) **arundinacea.**

Fl. Dec.–Jan. In forests, rare.—St. Jan (Cinnamon Bay); Vieques (Campo Asilo).

846. Pharus glaber, Kth.

Fl. June–Dec. Anthers yellow; stigmas white. In forests, not uncommon.—All islands.

847. Pappophorum alopecuroides, Vahl.

Fl. Feb.–March. 1′–3′ high. Among rocks near the coast, rare.—Buck Island, near St. Thomas; Virgin Gorda (Vahl in Symb. Bot. iii, 10).

848. Bouteloua litigiosa, Lag.

Fl. Oct.–Jan. Anthers red; stigmas white. In thickets and waste places, not uncommon.—St. Thomas (Cowell's Hill—Town).

849. Leptochloa mucronata, Kth.

Fl. May–Oct. Spikelets often 1-flowered. Along ditches, not uncommon.—St. Croix.

850. L. virgata, P. Br. *α*), *β*) **gracilis,** Ns., and *γ*) **multiflora,** Egg.

Fl. May–Dec. Anthers white; stigmas purple. *γ*) spikelets 9-flowered. Awns very short; fertile glumes not ciliate. Along roads, common.—*α*) and *β*) all islands; *γ*) St. Croix (Work and Rest).

851. Chloris eleusinoides, Gris.

Fl. May–Nov. Along ditches, here and there.—St. Croix (Beeston Hill, Mount Welcome).

852. Ch. radiata, Sw.

Fl. May–Oct. Stigmas brown. Gregarious along roads, common.—All islands.

853. Ch. ciliata, Sw.

Fl. Feb.–Sept. Anthers rosy. My specimens show only one sterile flower in each spikelet besides the fertile one (see Swartz's Flora Ind. Occ. p. 189). Along roads, not uncommon.—All islands.

854. Dactyloctenium ægyptiacum, W. (v. Ten-per-cent Grass).

Fl. March–Nov. Anthers straw-coloured; stigmas white. A good pasture-grass. Along roads and in fields, common.—All islands.

855. Eleusine indica, L.

Fl. March–Dec. Anthers greyish; stigmas purple. Common everywhere.—All islands.

856. Cynodon Dactylon, Pers. (v. Bay Grass, Billy Grass).

Fl. May–Oct. Anthers straw-coloured, with purple spots; stigmas purple. A good pasture-grass, and fit for making good hay, but at the same time a most troublesome weed in cane-fields on account of its long and creeping rhizome. Said to have been introduced. Along the coast and in fields, gregarious.—St. Croix and St. Thomas (very common); St. Jan (uncommon, Little Plantation).

857. Paspalum compressum, Ns. (v. Flat Grass).

Fl. June–Oct. Anthers light yellow; stigmas white. Near ditches and in shady localities, not uncommon.—All islands.

858. P. conjugatum, Berg.

Fl. June–Dec. Anthers yellow; stigmas white. In moist localities, common.—All islands.

859. P. pusillum, Vent.

St. Thomas (Flügge sec. Gris. Syst. Unt., p. 114).

860. P. distichum, L. *α*) and *β*) **vaginatum**, Sw.

Fl. June–Aug. Proterandrous. Anthers light yellow; stigmas black. Along rivulets, not uncommon.—St. Croix; St. Thomas.

861. P. notatum, Flügge.

St. Thomas (Flügge sec. Gris. Syst. Unt., p. 114).

862. P. cæspitosum, Flügge.

Fl. May–Sept. Anthers orange-coloured. In moist localities, not uncommon.—All islands.

863. P. glabrum, Poir.

Fl. May–July. Here and there along ditches.—St. Thomas (Schl.); St. Jan (Riff Bay).

864. P. plicatulum, Michx.

Fl. March–Sept. Along the seacoast, not uncommon.—All islands.

865. P. virgatum, L. *α*).

Fl. May–Oct. Anthers straw-coloured; stigmas white. In moist localities, not uncommon.—All islands.

866. P. paniculatum, L.

St. Thomas (Schlechtendal).

867. P. spathaceum, HB. K.

St. Thomas (Schlechtendal).

868. Digitaria filiformis, Mühl.

Fl. Dec. In dry thickets, here and there.—St. Thomas (Cowell's Hill).

869. D. marginata, Lk. (v. Running Grass).

Fl. March–Sept. Anthers purple with white stripes; stigmas purple. A good pasture-grass. Along ditches and roads, common.—All islands.

870. D. setigera, Kunth.

Fl. June–Oct. Anthers and stigmas purple. Along roads, common.—All islands.

871. Eriochloa punctata, Hamilt.

Fl. March–Sept. Anthers brownish; stigmas black. In moist localities, here and there.—St. Croix (Crequis, La Grange); St. Thomas (Schl.).

872. Stenotaphrum americanum, Schrank (v. Horse Grass).

Fl. May–Aug. Anthers orange-coloured; stigmas purple. Along the coast and in moist localities, gregarious, common.—All islands.

873. Orthopogon setarius, Spreng.

Fl. March–Dec. Anthers light purple; stigmas purple. In forests, common.—All islands.

874. Panicum paspalcides, Pers.

Fl. March–Sept. Anthers reddish; stigmas straw-coloured. The hermaphrodite flower in this and all other species of Panicum is proterandrous, the stamens dropping off before the stigmas appear. These latter are then fertilized by the agency of the wind from other individuals before the stamens of the male flower make their appearance, self-fertilization being thus evidently impossible. Along rivulets and in moist localities, not uncommon.—St. Croix; St. Thomas.

875. P. brizoides, L.

St. Thomas (Schlechtendal).

876. P. colonum, L.

Fl. March–Sept. Anthers purple; stigmas black. Along roads and ditches, common.—All islands.

877. P. prostratum, Lam. *α*) and *β*) **pilosa**, Egg.

Fl. June–July. Anthers orange-coloured; stigmas black. *β*) Rhachis of spikelets pilose.—*α*) All islands (common); *β*) St. Croix (La Grange).

878. P. fuscum, Sw. (v. Sour Grass). *α*) and *β*) **fasciculatum**, Sw.

Fl. Feb.–Sept. Anthers orange-coloured; stigmas purple. Abhorred by the cattle.—*α*) All islands. *β*) St. Croix; St. Thomas (Schlechtendal). Not uncommon.

879. P. molle, Sw. (v. Yerba de Pará, Spanish Grass).

Fl. May–Oct. Anthers yellow; stigmas purple. Naturalized here and there in pastures.—St. Croix (Cotton Grove).

880. P. diffusum, Sw.

Fl. May–Oct. Anthers orange-coloured; stigmas dark purple. In moist localities, uncommon.—All islands.

881. P. maximum, Jacq. (v. Guinea Grass) (*P. polygamum*, Sw.).

Fl. June–Sept. Anthers brownish; stigmas light purple. A splendid pasture-grass, growing to the height of 12′, forming dense tufts and being propagated by the rhizome. Naturalized and cultivated everywhere.—All islands.

882. P. divaricatum, L. *α*) and *β*) **puberulum**.

Fl. May–Dec. Anthers light yellow; stigmas white. Resembling a thin Bamboo Cane. 8′–16′ high. Both forms not uncommon in forests, climbing over trees and shrubs.—All islands.

883. P. glutinosum, Sw.

St. Croix (West, p. 267).

884. P. brevifolium, L.

Fl. Aug.–Dec. Anthers and stigmas white. In gardens and along roads, here and there.—St. Thomas (Barracks).

885. P. cayennense, Lam.

St. Thomas (Schlechtendal).

886. Setaria glauca, P. Br. *α*).

Fl. May–Oct. In forests, common.—All islands.

887. S. setosa, P. Br. *α*) and *β*) **caudata**, R. S. (v. Sour Grass).

Fl. April–Dec. Anthers orange-coloured; stigmas purple. *α*) 3′–7′ high; in forests and along ditches, common.—All islands. *β*) in dry thickets, uncommon.—St. Thomas (Cowell's Hill).

888. Cenchrus echinatus, L. *β*) **viridis**, Spreng. (v. Burr Grass).

Fl. April–Dec. Anthers light yellow; stigmas white, with a purple spot in the middle. The ripe farinaceous seeds eaten by the cattle. Along the coast, very common.—All islands.

889. Anthephora elegans, Schreb.

Fl. Jan.–Oct. Anthers brownish. In thickets, here and there.—St. Croix; St. Thomas.

890. Tricholæna insularis, Gris. (v. Bitter Grass, Long Grass).

Fl. March–Dec. Anthers brownish; stigmas white. Never touched by cattle whilst green, on account of its bitter taste. Spikelets easily detached and carried far away by the wind. Very common along roads and in dry places.—All islands.

891. Lappago aliena, Spreng.

Fl. May–Dec. Stigmas white. Generally both spikelets fertile. Near ditches and in thickets, common.—All islands.

892. Andropogon saccharoides, L.

Fl. Aug.–Oct. Anthers light yellow; stigmas dark purple. Awn not twisted. Along roads, here and there.—St. Croix (Beeston Hill Grange).

893. Anatherum bicorne, P. Br. (v. Jolly Grass).

Fl. July–Oct. 2′–4′ high. Used for thatching roofs. Not eaten by the cattle. Gregarious on high hills, where it is difficult to counteract its spreading, even by burning it now and then.—St. Thomas (northern slope of the highest ridge).

894. Sorghum vulgare, Pers. (v. Guinea Corn).

Fl. Dec. 8′–16′ high. Naturalized and cultivated for herbage and for making flour of the grain.—All islands, principally St. Croix and Vieques.

895. Saccharum officinarum, L. (v. Sugar-cane).

Fl. Dec.–May. Naturalized and cultivated. Sugar-growing islands are now only two, viz., St. Croix and Vieques, whilst the other Virgin Islands have only a very few cane estates, principally for selling the raw cane in the markets. The average produce of sugar from both the above-mentioned islands is about 25 million pounds. The plant is propagated by cuttings that are laid entirely under ground.

(The genus *Panicum* excepted, all *Graminaceæ* are proterogynous.)

[Cultivated species: *Andropogon Schœnanthus*, L. (v. Lemon-grass), *Zea Mays*, L. (v. Indian Corn), and *Coix Lacryma*, L. (v. Job's Tears).]

CYPERACEÆ.

896. Cyperus polystachyus, Rottb.

Fl. July. On high hills, rare.—St. Thomas (Crown, 1500′).

897. C. lævigatus, L. (Cod. p. 61) (*C. mucronatus*, Rottb.). *a*) **albidus**.

Fl. March–Oct. Connective pointed. Along rivulets, not uncommon.—St. Croix; St. Thomas (Schl., Böckeler).

898. C. compressus, L.

Fl. Dec. Flowers 2-androus. Near the coast in moist places, uncommon.—St. Thomas (Haven Sight).

899. C. confertus, Sw.

Fl. Dec. In thickets, here and there.—St. Thomas (Cowell's Hill); St. Croix (Gris. Fl. 563).

900. C. ochraceus, Vahl.

Fl. May–Oct. In moist localities, uncommon.—St. Croix (Crequis).

901. C. viscosus, Ait.

Fl. April–Nov. Stamens always 3 (see Swartz's Fl. Ind. Occ. p. 113). Seeds germinating in moist weather on the parent, and often growing out into young plants an inch or two in length. Along rivulets and ditches, not uncommon.—St. Croix; St. Thomas.

902. C. surinamensis, Rottb.

St. Thomas (Schl.).

903. C. articulatus, L. (v. Sting Bisom).

Fl. March–Sept. In ditches, not uncommon.—St. Croix; St. Thomas.

904. C. rotundus, L. (v. Nut Grass).

Fl. all the year round. Tubers sweet, eaten by hogs. A troublesome weed, very common in fields and along roads.—All islands.

905. C. brunneus, Sw. (*C. planifolius*, Rich.).

Fl. May. On the coast and near lagoons, not uncommon.—All islands.

906. C. sphacelatus, Rottb.

Fl. Feb. On high hills in pastures, uncommon.—St. Thomas (Signal Hill).

907. C. distans, L.

Fl. Aug. In pastures on high hills, common.—St. Thomas (Signal Hill).

908. C. unifolius, Bœckler (Linnæa, Neue Folge, ii, 374).

St. Croix (Ravn in Reliq. Lehm.).

909. C. filiformis, Sw.

Fl. all the year round. In moist localities, not uncommon.—St. Thomas.

910. C. odoratus, L.

Fl. April–Oct. Near rivulets and ditches, here and there.—St. Croix (Mount Pleasant, Annas Hope).

911. C. pennatus, Lam. (Bœckler, l. c. 404) (*C. Ehrenbergii*, Kth., *C. flexuosus*, Vahl).

Fl. all the year round. Along the coast, not uncommon.—St. Thomas.

912. C. ligularis, L.

Fl. March–Dec. Along rivulets, not uncommon.—All islands.

913. C. flavomariscus, Gris. (*C. flavus*, Bœckler).

Fl. Aug. In pastures on hills, here and there.—St. Thomas (Signal Hill); Buck Island (near St. Thomas).

914. Kyllinga filiformis, Sw. *α*) and *γ*) **capillaris**, Gris.

Fl. June–Dec. Involucral leaves of various lengths. Both forms not uncommon in forests.—St. Croix (The William, Eliza's Retreat).

915. K. triceps, Rottb.

Fl. March. In shady moist localities.—St. Jan (Baas Gut).

916. K. monocephala, Rottb.

Fl. all the year round. In moist places in forests, common.—All islands.

917. K. brevifolia, Rottb. (Emend. in Bœckler, Linnæa, 1857, 425). *β*) **longifolia**.

St. Thomas (Ehrenberg sec. Bœckler).

918. Scirpus capitatus, L.

Fl. all the year round. Achenium black. Along rivulets, common.—All islands.

919. S. nodulosus, Kth.

Fl. March–Dec. Along rivulets and in ditches, uncommon.—St. Croix (Adventure).

920. S. subdistichus, Bœckler (Linnæa, 1869–70, 490).

St. Thomas (Bcklr.).

921. S. mutatus, Vahl.

Fl. March–Dec. Filaments flat; style often bifid. In moist places, not uncommon.—St. Croix; St. Jan.

922. S. ferrugineus, L.

Fl. all the year round. Filaments flat. Gregarious in tufts on the sandy seashore and near lagoons, uncommon.—St. Croix (Frederiksted); St. Jan (Reef Bay).

923. S. brizoides, Sw. (*Fimbristylis polymorpha*, Bœckler).

Fl. Aug.–Sept. In pastures on high hills, common.—Virgin Islands.

924. Rhynchospora pusilla, Gris.

Fl. Feb.–July. Anthers $1\frac{1}{4}'''$ long. In pastures on hills, rare.—St. Thomas (Signal Hill, 1400′).

925. R. pura, Gris.

Fl. Feb.–Aug. Seeds often germinating on the parent. In the same places as the preceding. St. Thomas (Signal Hill).

926. Scleria pratensis, Lindl. (v. Cutting Grass).

Fl. April–Nov. In forests and pastures on high hills, uncommon.—St. Croix (Springfield, Mount Eagle); St. Thomas (Signal Hill).

927. S. scindens, Ns. (v. Razor-grass).

Fl. Aug.–Sept. In forests, rare.—St. Thomas (Signal Hill, 1500′).

928. S. filiformis, Sw. (*S. lithosperma*, W.).

Fl. May–Nov. In thickets, not uncommon.—St. Croix (King's Hill); St. Thomas (Cowell's Hill).

[All *Cyperaceæ* are proterogynous, with white stigmas and light yellow anthers.]

LILIACEÆ.

929. Aloe vulgaris, L. (v. Sempervivie).

Fl. March–April. Gregarious on limestone (naturalized?), common.—All islands.

930. Yucca gloriosa, L.

Fl. June–Aug. Naturalized in gardens and near dwellings.—St. Croix; St. Thomas.

931. Agave americana, L. (v. Karatá).

Fl. Feb.–May. On dry hills, common.—All islands.

932. A. sobolifera, Salm-Dyck. (v. Karatá).

Very seldom or never bearing flowers. Propagated by bulblets in June–July, growing out to a considerable size whilst still on the parent. On hills and in thickets, not uncommon.—All islands.

933. Fourcroya cubensis, Haw. (v. Female Karatá).

Fl. March and July–Aug. In dry thickets, not uncommon.—St. Croix; St. Thomas.

934. Pancratium caribæum, L. (v. White Lily, Ladybus).

Fl. May–Nov. Flowers nocturnal; fragrant. On rocky coasts, not uncommon.—All islands.

935. Crinum erubescens, Ait.

Fl. all the year round. Flowers nocturnal; fragrant. Along rivulets, here and there.—St. Croix (Hógensborg).

936. Amaryllis equestris, Ait. (v. Red Lily).

Fl. March–Oct. On rocky shores, gregarious, not uncommon.—All islands.

937. A. tubispatha, Ker. (v. Snow-drop).

Fl. April–Oct., especially after heavy rains. In fields and near dwellings, not uncommon.—All islands.

[Cultivated species: *Allium fistulosum*, L. (v. Ciboule), *Polyanthes tuberosa*, L. (v. Tuberose), and *Crinum giganteum*, Andr.]

ASPARAGINACEÆ.

938. Sanseviera guineensis, W. (Spec. ii, 159) (Bot. Mag. t. 1179) (v. Guana-tail).

Fl. Nov.–Dec. Fibres of the leaves yield a good material for ropes. Naturalized here and there on dry hills, gregarious.—St. Croix (Friedensfeld); St. Thomas (around town).

SMILACEÆ.

939. Smilax havanensis, Jacq.

Not seen flowering. In forests, here and there.—St. Croix (Caledonia, Wills Bay, Rohr's Minde).

940. S. populnea, Kth. (Enum. Plant. v, 192).

Fl. June-July (♂). Unarmed. Leaves 4″–5″ long, 3″–4″ broad. In forests, a high climber, rare.—St. Thomas (Flag Hill, 900′).

DIOSCOREACEÆ.

941. Dioscorea pilosiuscula, Bert.

Fl. Dec., but rarely. Older leaves purple beneath, broad white stripes on the upper surface. Male inflorescence 3″ long, pendulous. Axillar bulbs large, often bifid, greyish-brown, generally producing leaves whilst still in connection with the parent, dropping off later and forming new plants. In shady forests, uncommon.—St. Thomas (Signal Hill, northern slope above St. Peter, 1000′).

942. D. alata, L. (v. Yam). *α*), *β*) **vulgaris,** Miq.

Not seen flowering. Propagated by the rhizome. Naturalized and cultivated in provision grounds. Rhizome affording a nutritive vegetable.—All islands.

943. D. altissima, Lam. (v. Yam).

Not seen flowering. Stem cylindrical. Occurring in the same places and used in the same way as the preceding.—All islands.

944. Rajania pleioneura, Gris.

Fl. Dec. In forests, rare.—St. Thomas (Flag Hill, 800′).

945. R. hastata, L.

Fl. Sept.–Dec. In forests and on fences on high hills, not uncommon.—St. Thomas (Signal Hill, Northside) (St. Croix?).

IRIDACEÆ.

946. Cipura plicata, Gris. (v. St. Jan Grass, Bloodroot).

Fl. all the year round. Bulbs crimson. Naturalized in gardens and valleys.—All islands.

BROMELIACEÆ.

947. Bromelia Pinguin, L. (v. Pinguin).

Fl. Dec. and April–June. Pulp edible, acid. Used for fences. Gregarious in forests and thickets, common.—All islands.

948. Chevalliera lingulata, Gris.

Fl. March–July. Petals white, with a bluish point. Berry glabrous, pink or blue. On trees and rocks on high hills, not uncommon.—St. Thomas (Crown, Signal Hill, 1500′); St. Jan (Macumbi).

949. Pitcairnia angustifolia, Ait.

Fl. Aug.–Sept. Seeds red, pointed at the base; appendage white, truncate. On trees and rocks.—St. Croix (rare, King's Hill Gut); Virgin Islands (common, especially on the coast).

950. Tillandsia fasciculata, Sw.

Fl. Jan.–Feb. Capsule a little shorter than the bract. On trees in forests and on high hills, uncommon.—St. Thomas (Crown); St. Jan (Baas Gut).

951. T. utriculata, L. (v. Wild Pine).

Fl. Feb.–Aug. Inflorescence over 8′ high. On trees and rocks, common.—All islands.

952. T. recurvata, L. (v. Old Man's Beard).

Fl. Jan.–Feb., but very rarely. Seeds often germinating in the capsule. Used for stuffing mattresses. On trees, gregarious, very common.—All islands.

953. T. usneoides, L. (v. Old Man's Beard).

Fl. March, rarely. Petals greenish. On shrubs, common, gregarious.—All islands.

954. Catopsis nutans, Gris.

Fl. June–Aug. Petals fleshy, white. Seeds brown; pappus 1¼″

long, white, silky. On trees and rocks on high hills, not uncommon.—St. Thomas (Signal Hill, Crown, 1400′–1500′).

[Cultivated species: *Ananassa sativa*, Lindl. (v. Pine-apple).

MUSACEÆ.

955. Musa paradisiaca, L. (v. Plantain).

Fl. May–Aug. Fruit eaten only boiled or fried. Naturalized and cultivated, but rare.—All islands.

956. M. sapientium, L. (v. Banana).

Fl. May–Nov. Fruit eaten raw or fried. Naturalized and cultivated everywhere, occurring in several varieties (Bacuba, Fig, Lady-finger, St. Vincent Banana, etc.).—All islands.

SCITAMINEÆ.

957. Renealmia sylvestris, Gris.

Fl. Aug. In forests in shady and moist localities, rare.—St. Croix (Golden Rock); St. Thomas (Signal Hill, 1400′).

958. Zingiber officinalis, Rosc. (v. Ginger).

Fl. Sept. Naturalized and cultivated in forest districts, here and there.—St. Croix; St. Thomas.

959. Canna indica, L. (v. Indian Shot).

Fl. all the year round. In moist places and near dwellings, not uncommon.—All islands.

960. C. Lamberti, Lindl. (v. Scarlet Indian Shot).

Fl. all the year round. Naturalized in gardens.—All islands.

961. C. edulis, Ker. (v. Tout-le-mois).

Fl. all the year round. Tubers used for producing salep. Naturalized and cultivated along rivulets.—All islands.

962. Maranta arundinacea, L. (v. Arrow-root).

Not seen flowering. Tubers yielding the best kind of salep. Naturalized and cultivated here and there.—All islands.

[Cultivated species: *Alpinia nutans*, Raf. (v. Shell-plant), and *Curcuma longa*, L. (v. Turmeric).

ORCHIDACEÆ.

963. Liparis elata, Lindl.

Fl. June–Dec. Bracts purple. My specimens on the whole somewhat smaller than the picture in Bot. Mag. t. 1175. On red clay among

rocks on high hills, here and there.—St. Thomas (Liliendal, Bonne Resolution).

964. Epidendrum subæquale, Eggers, n. sp.

Fl. Feb.–March. Tubers cylindrical, small, several-leaved. Leaves 2–5, linear, channelled, pointed, much shorter than the scape; sterile bracts short, distant, pointed, floral ones smaller; flowers in a simple raceme, 3–4. Perigonial divisions lanceolate, pointed, nearly conform. Lip slightly adnate to the column, 3-lobed; lobes rounded, the two lateral ones a little shorter than the middle one. Column auricled below the anther; auricles small, purple. Ovary linear, striate, ½″ long. Allied to *E. aciculare*, Batem., but leaves several, much shorter than the scape, and lip broadly 3-lobed. Leaves 5″–6″ long, 2‴ broad; scape 20″–24″ high, straight. Peduncles ½″ long; perigonial divisions greenish, with brown spots, ½″ long; lip purple, with darker stripes and a yellow crest in the middle, ½″ long. The whole plant of a sometimes darker, sometimes lighter hue, flowers even sometimes quite white. On rocks and the roots of trees in dry thickets, here and there.—St. Thomas (Cowell's Hill, Solberg).

965. E. bifidum, Aubl.

Fl. May–Dec. On trees and rocks, not uncommon.—All islands.

966. E. ciliare, L.

Fl. June–Feb. Flowers fragrant. Gregarious on rocks and old tree-trunks, common.—All islands.

967. E. cochleatum, L. (Bot. Mag. t. 151, bad).

Fl. April–May. On trees in forests, rare.—St. Croix (Mount Eagle, 1150′; Jacob's Peak, 950′).

968. E. patens, Sw.

Fl. July–Aug. Leaves distichous; scape compressed, 1′–2′ high. On rocks in leaf-mould, rare, on high hills.—St. Thomas (Signal Hill, 1500′).

969. Brassavola cucullata, R. Br.

Fl. June–Octb. Gregarious on rocks, rare.—St. Thomas (John Bruce Bay).

970. Polystachya luteola, Hook.

Fl. March–Nov. Flowers often cleistogamous and normal on the same branch and at the same time. Both forms yielding good seeds. On rocks and old tree-trunks, not uncommon on hills.—St. Thomas (Signal Hill, 1200′–1500′).

971. Oncidium Lemonianum, Lindl.

Fl. May–July. Never giving fruit, but propagating itself by producing young plants from buds in the axils of the sterile bracts below the flowers, which remain in connection with the parent plant, and thus often forming long colonies of plants from one tree to another. In forests and thickets, gregarious, but rare.—St. Thomas (Picara Peninsula, Fortuna).

(The lateral sepals in my specimens being distinct, I am inclined to retain Lindley's specific name instead of uniting my plant with *O. tetrapetalum*, W., as done by Grisebach.)

972. O. variegatum, Sw.

Fl. July–Octb. On rocks and trees in shady places, not uncommon.—Virgin Islands.

973. Prescottia myosurus, G. Rchb.

Fl. March. In grass-fields on high hills, uncommon.—St. Thomas (Signal Hill, 1400′).

974. Spiranthes elata, Rich.

Fl. March. Leaves deciduous during anthesis. In leaf-mould on high hills, not uncommon.—Virgin Islands.

975. Stenorrhynchus lanceolatus, Rich.

Fl. May. Leaves deciduous during anthesis. Only ½′–1′ high. In clayey soil among rocks on high hills, rare.—St. Thomas (Signal Hill, Crown).

976. Habenaria maculosa, Lindl.

Fl. Feb. Spur 1″ long, nectariferous. In pastures on high hills, rare.—St. Thomas (Signal Hill).

977. H. alata, Hook.

Fl. Feb. Spur 6‴ long, nectariferous. In the same localities as the preceding, rare.—St. Thomas (Signal Hill, above St. Peter, 1400′).

II. CRYPTOGAMÆ VASCULARES.

LYCOPODIACEÆ.

978. Lycopodium cernuum, L.

Gregarious among rocks on high hills, here and there.—St. Thomas (Crown, Signal Hill).

979. Psilotum triquetrum, Sw.

In shady places among rocks, not uncommon.—St. Croix (Crequis); St. Thomas (Signal Hill).

FILICES.

980. Ophioglossum reticulatum, L.

In pastures under rocks on high hills, not uncommon.—St. Thomas (Crown).

981. Davallia aculeata, Sw. (v. Prickly Fern).

In pastures on high hills, here and there.—St. Thomas (Signal Hill, above St. Peter, 1300′).

982. Adiantum villosum, L.

Among rocks in forests, uncommon.—St. Croix (Crequis, Vieques).

983. A. intermedium, Sw.

On high hills, not uncommon.—St. Thomas (Signal Hill).

984. A. microphyllum, Kaulf.

Fragrant in the morning. In dense forests, uncommon.—St. Thomas (Crown).

985. A. tenerum, Sw. (v. Maiden-hair).

In thickets, not uncommon.—All islands.

986. A. fragile, Sw.

In the same localities as the preceding, uncommon.—All islands.

987. Cheilanthes microphylla, Sw.

St. Croix (West, p. 313, Benzon in Hb. Havn.); St. Thomas (Ravn in Hb. Havn.).

988. Pteris longifolia, L.

Along rivulets in forests, rare.—St. Croix (Crequis).

989. P. pedata, L.

Gregarious in forests, here and there.—St. Thomas (Signal Hill, near St. Peter).

990. Tænitis lanceolata, R. Br.

In leaf-mould on rocks, not uncommon.—All islands.

991. Antrophyum lineatum, Kaulf.

In forests, rare.—St. Thomas (St. Peter).

992. Blechnum occidentale, L.

Gregarious in pastures and forests, very common.—All islands.

993. Chrysodium vulgare, Fée.

In marshy soil, gregarious; up to 15′ high. Not uncommon.—All islands.

994. Hemionitis palmata, L. (v. Strawberry Fern).

Propagating itself by buds from the serratures of the frond. Gregarious in shady forests, here and there.—St. Croix (Eliza's Retreat); St. Jan (Rogiers, King's Hill).

995. Gymnogramme calomelanos, Kaulf. (v. Silvery Fern).

On hills and among stones, not uncommon.—All islands.

Var. pumila, Egg.

Dwarfy, cartilaginous. On old walls, here and there.—St. Croix (Bodkin); St. Thomas (Cowell's Battery).

996. Asplenium serratum, L.

Frond up to 4′ long. On rocks in forests, very rare.—St. Thomas (Signal Hill, 1400′).

997. A. firmum, Kze.

St. Thomas (Griseb. Syst. Unters. p. 134) (*A. abscissum*, W.).

998. A. pumilum, Sw.

On clayey soil in forests, gregarious, here and there.—St. Thomas (Matthis Gut); St. Jan (Rogiers).

999. Aspidium punctulatum, Sw.

In forests, not uncommon.—St. Thomas.

1000. A. semicordatum, Sw.

In shady localities, not uncommon.—Virgin Islands.

1001. A. patens, Sw.

In forests, here and there.—St. Croix (Crequis); St. Thomas (Crown).

1002. A. molle, Sw.

In the same localities as the preceding, not uncommon.—St. Thomas (Signal Hill).

1003. A. invisum, Sw. *a*).

In shady localities, rare.—St. Croix (Crequis).

1004. Polypodium tetragonum, Sw.

In forests, not uncommon.—All islands

1005. P. crenatum, Sw.

St. Croix (West, p. 313, Benzon in Hb. Havn.); St. Thomas (Hb. Havn.).

1006. P. aureum, L.

On dead trees and rocks, not uncommon.—All islands.

1007. P. areolatum, Thunb.

In the same places as the preceding, but rare.—St. Thomas (Crown).

1008. P. incisum, Sw.

St. Croix (West, p. 313).

1009. P. incanum, Sw.

Among roots of large trees, gregarious, not uncommon. All islands.

1010. P. piloselloides, L.

In forests and pastures among rocks on high hills, here and there.—St. Thomas (Signal Hill, 1300′).

1011. P. serpens, Sw.

On trees and rocks on high hills, rare.—St. Croix (top of Mount Eagle, 1150′).

1012. P. Phyllitidis, L. *a*) and *β*) **repens**.

In forests on rocks and trees, not uncommon.—All islands.

1013. Cyathea arborea, Sw.

Stem 12′–15′ high, 3″ diam. In forests on high hills, rare.—St. Thomas (Crown, western slope, 1400′; Caret Bay Gut).

CORRECTIONS AND ADDITIONS.

Page 19. Fourteenth line from above, after "local name" read—which as a rule is derived either from the English or the Dutch language, except in Vieques and Culebra.

Page 84. To *Avicennia nitida*.—The ground under the tree is sometimes covered with a peculiar kind of aerial roots, proceeding from the underground roots erect into the air to a height of four to six inches.

Page 99. To *Aroideæ*.—A supposed Aroidea with an immense, nearly aphyllous, climbing, terete, green stem, about 100′ long, 1″ diam., with scaly, early deciduous leaves and aerial roots resembling those of Vanilla, is met with in a few places in St. Thomas (among rocks on Flaghill in the forest). As, however, neither fruit nor flower has as yet been found, it is still doubtful even to which family this interesting species may belong.

Page 100, No. 827. Cancel the lines, "Leaves used for making ropes, thatching roofs, and other domestic purposes."

Add before No. 828:

827ª. *Th. parviflora*, Sw. (v. Bull-Seger). Fl. May–July; stem 30′–40′ high, up to 3′ in circumference. Berry in both species black, fleshy. Leaves of this species are used for making ropes, hats, roofs, and for other domestic purposes. On the northern slopes of the hills, common.—Virgin Islands.

Add before *Commelynaceæ*:

(Cultivated species: *Phœnix spinosa*, Thonning, and *Latania borbonica*, L.)

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The names in *italics* are those of the cultivated plants of the islands.

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It has been prepared at the request of the Institution, and printed by authority of the honorable Secretary of the Interior.

SPENCER F. BAIRD,
Secretary Smithsonian Institution.

SMITHSONIAN INSTITUTION,
Washington, April 3, 1879.

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CATALOGUE

OF THE

COLLECTION TO ILLUSTRATE

THE

ANIMAL RESOURCES AND THE FISHERIES

OF THE

UNITED STATES,

EXHIBITED AT PHILADELPHIA IN 1876 BY THE SMITHSONIAN INSTITUTION AND THE UNITED STATES FISH COMMISSION, AND FORMING A PART OF THE UNITED STATES NATIONAL MUSEUM.

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INTRODUCTORY NOTE.

On the occasion of the International Exhibition, in 1876, certain appropriations were made by Congress to the Smithsonian Institution and the United States Fish Commission. The former was called upon to prepare an exhibition to illustrate the economical value of the mineral and animal products of the country, while the latter was to perform a similar task for the national fisheries. It was subsequently found desirable for the Smithsonian Institution to unite with the Indian Bureau in displaying the condition of the aboriginal tribes of the United States in prehistoric and modern times. Four distinct departments of work were thus provided for, (1) an ethnological exhibition, (2) an exhibition of minerals, (3) an exhibition of animal resources, and (4) a fishery exhibition. The first and second were arranged on opposite sides of the nave in the Government building, at Philadelphia, and at its north end. The latter, it was found, could not be separated, since the character of the specimens and the methods of arrangement required were the same. They were arranged in one series on the north side of the east transept and to the east of the nave extending north to the beginning of the mineral series.

The following catalogue is a simple enumeration of the objects exhibited in this series, and illustrative of the animal resources and the fisheries of the United States. It is essentially a reproduction of the card-catalogue prepared in 1876 and still in use in the administration of the collection, which, having been greatly augmented by systematic efforts in the United States and by donations from foreign governments, now forms an important section of the United States National Museum. The catalogue has been as far as practicable made complete up to the present time, in so far as it relates to North America. No effort has, however, been made to include the collateral series of specimens from foreign countries.

The plan of arrangement is fully shown in the TABLE OF CONTENTS. Beginning with the Useful and Injurious Animals, it next takes up the MEANS OF PURSUIT AND CAPTURE, then, successively, the METHODS OF PREPARING THEM FOR USE, THE USEFUL PRODUCTS, and, finally,

the MEANS OF PROTECTION AND CULTURE. The preliminary plan of classification is given in full, whether specimens were obtained to illustrate it or not, and indicates wherein the collection isstill imperfect.*

It seems appropriate to remark that a very large number of the specimens included in this catalogue and exhibited in Philadelphia were borrowed from the permanent collections of the National Museum, and have for many years been on exhibition in the Smithsonian building.

G. BROWN GOODE.

WASHINGTON, *April* 11, 1879.

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*For a fuller exposition of this plan see the following pamphlet:

International Exhibition 1876. | Board in Behalf of United States Executive Departments. | ==== | Classification | of the | Collection to Illustrate | the Animal Resoures of the United States. | A List of Substances derived from the Animal Kingdom, with Synopsis of the Useful and Injurious Animals | and a Classification of the Methods | of Capture and Utilization. | ——— | By G. Brown Goode, M. A., | Assistant Curator | U. S. National Museum. | ——— | Washington: | Government Printing Office. | 1876. | 8vo. pp. xiii (1) 126. Also published as Bulletin No. 6, Department of the Interior, United States National Museum; and as Article VI in Vol. XII of the Smithsonian Miscellaneous Collections, Washington, 1878.

SECTION A.

LIST OF ANIMALS OF NORTH AMERICA BENEFICIAL OR INJURIOUS TO MAN.

*I. MAMMALS.

ORDER FERÆ.

SUBORDER FISSIPEDIA.

FELIDÆ.

Lynx rufus, (Guldenstädt,) Raf.—BAY LYNX or WILD CAT.—North America.

12476. Mounted. Denver, Col. C. E. Aiken. Dec. 14, 1875.
12477. Mounted. (Young.) Denver, Col. C. E. Aiken.

Lynx canadensis, (Geoff. & Desm.,) Raf.—CANADA LYNX.—Northern North America.

12475. Mounted. Houlton, Me. Rev. R. R. McLeod. Dec. 15, 1875.

Felis eyra, Desm.—EYRA CAT.—Southwestern North America.

9532. Mounted. Tehuantepec, Mex. F. Sumichrast.

Felis yaguarundi, Desm.—YAGUARUNDI CAT.—Southwestern North America.

8480. Mounted. Tabasco, Mex. Col. Sarto.

Felis concolor, Linn.—PUMA or COUGAR.—America generally.

11813. Mounted. Central Colorado. James Stevenson. 1874.

Felis onca, Linn.—JAGUAR.—Southwestern States, Central and South America.

10390 + 12296. Mounted. Died in captivity at Government Insane Asylum, Washington.*

* The numbers prefixed to the enumeration of specimens are Smithsonian catalogue numbers. When two numbers are given, separated by the mark of division (÷), the first mentioned refers to the particular preparation of the animal in question; the second, to some other related part entered in a different series. For example, in 10390 ÷ 12293, the first number belongs to the skin and the second to the skeleton of a specimen of *Felis onca*.

Felis pardalis, Linn.—OCELOT or TIGER CAT.—Southwestern North America.

12179 + 14179. Mounted. Talamanca, Costa Rica. Talamanca expedition. Prof. W. M. Gabb.

12187. Mounted. Talamanca, Costa Rica. Talamanca expedition. Prof. W. M. Gabb.

CANIDÆ.

Canis lupus, Linn., *var.* **grisco-albus.**—GRAY WOLF.—North America generally.

3573 + 3520. Mounted. (Winter pelage.) Platte River, Neb. C. Drexler.

Vulpes fulvus, (Desm.,) *var.* **fulvus,** (Desm.)—RED FOX.—Northern North America.

7124. Mounted. (Male.) La Pierre's House, Rocky Mts. R. Kennicott. Dec., 1861.

6403. Mounted. (Female.) Yukon River. R. Kennicott. Oct. 21, 1860.

Vulpes fulvus, (Desm.,) *var.* **decussatus.**—CROSS FOX.

6407. Mounted. (Female). Ft. McPherson, Peels River, Hudson's Bay Territory. R. Kennicott. Nov. 28, 1861.
"A very fine cross fox, nearly silver, small and apparently young. The Indians told me she would be a silver fox next year."—Kennicott.

6408. Mounted. (Female.) Ft. McPherson, Peels River, H. B. T. R. Kennicott. Nov. 30, 1861.
"A good typical cross fox; tail rather small."—Kennicott.

6404. Mounted. (Male.) Yukon River. R. Kennicott. Oct. 22, 1860.
"A rather fine cross fox, approaching more nearly the silver fox than the red."—Kennicott.

12466. Mounted. Houlton, Maine. Rev. R. R. McLeod. Dec. 31, 1875.

Vulpes fulvus, (Desm.,) *var.* **argentatus.**—SILVER FOX: BLACK FOX.

6410. Mounted (Male.) Yukon River. R. Kennicott. Nov. 17, 1860.
"A fine silver fox."—Kenn.

6411. Mounted. (Female.) Ft. McPherson, Peels River, H. B. T. R. Kennicott. Oct. 17, 1861.
"Black fox; some had still less silver."—Kenn.

Vulpes macrurus, Baird.—PRAIRIE FOX.—Western States.

——. Mounted. Wyoming.

Vulpes velox, (Say,) Aud. & Bach.—KIT FOX or SWIFT FOX.—Western States.

12470. Mounted. Colorado. Chas. E. Aiken. Jan. 15, 1876.

12469. Mounted. Colorado. Chas. E. Aiken. Jan. 15, 1876.

11085. Mounted. Rocky Mountains.

Vulpes lagopus, (Linn.,) Gray.—ARCTIC FOX.—Alaska.

——. Skin. St. Paul's Id., Alaska. G. R. Adams.

Urocyon virginianus, (Schreber,) Gray.—GRAY FOX.—United States generally.

——. Mounted. Virginia.

Urocyon virginianus, (Schreber,) *var.* **littoralis.**—COAST GRAY FOX.—Islands of the California coast.

12440. Mounted. Santa Cruz, Cal. H. W. Henshaw. U. S. Survey W. of 100 M.

MUSTELIDÆ.

Mustela Pennanti, Erxl.—FISHER.—Northern North America.

12472. Mounted. Houlton, Maine. Rev. R. R. McLeod. Jan. 15, 1876.
3279. Mounted. Olympia, W. T. Geo. Gibbes.

Mustela americana, Turton.—PINE MARTIN or AMERICAN SABLE. Northern United States.

12544. Mounted. Hudson's Bay Territory. R. Kennicott.
379. Mounted. Hudson's Bay Territory. R. Kennicott
—— Mounted. Hudson's Bay Territory. R. Kennicott.
1015. Mounted. Hudson's Bay Territory. R. Kennicott.
6414. Mounted. Yukon River, mouth of Porcupine, Hudson's Bay Territory. R. Kennicott.
6429. Mounted. Yukon River, mouth of Porcupine, Hudson's Bay Territory. R. Kennicott.

Putorius erminea, (Linn.,) Cuvier.—WHITE WEASEL: ERMINE.—Northern United States.

9355. Mounted. Kodiak. F. Bischoff. 1868.
6498 ÷ 1029. Mounted. (Male.) Yukon River, mouth of Porcupine R. R. Kennicott.
1427. Mounted. (Male.) Middleboro, Mass. J. W. P. Jenks.

Putorius longicauda, Bonaparte.—LONG-TAILED WEASEL.—Western United States.

9350. Mounted. Wyoming Territory. Dr. F. V. Hayden.

Putorius vison, Rich.—MINK.—North America generally.

12432. Mounted. (Male.) Moore's Lake, Minn. J. H. Batty.
4396. Mounted. Liard River. R. Kennicott.
1653 ÷ 12309. Mounted. United States.
2392. Mounted. Cape Flattery, W. T. Dr. Suckley.

Putorius nigripes, Aud. & Bach.—BLACK-FOOTED FERRET.—Western States (in holes of Prairie dogs).

12409. Mounted. Spotted Tail Agency, Neb. Col. A. Chambers, U. S. A. Oct. 1, 1875.
12462. Mounted. Cheyenne, Wyoming. Capt. Jas. Gilliss, U. S. A. Dec. 27, 1875.

Gulo luscus, Sabine.—WOLVERENE or GLUTTON.—Northern North America.

3747. Mounted. Great Salt Lake, Utah. Capt. Stansbury.
4361. Mounted. Ft. Simpson, H. B. T. B. R. Ross.

Taxidea americana, Waterh.—AMERICAN BADGER.—Western United States and Pacific Slope.

12471. Mounted. Colorado. Chas. E. Aiken. Jan. 15, 1876.

Mephitis mephitica, (Shaw) Baird.—COMMON SKUNK.—Eastern United States.

4348. Mounted. Washington, D. C. C. Drexler.
12522. Mounted. Golden, Col. C. E. Aiken.
1071. Mounted. Middleboro, Mass. J. W. P. Jenks.
4127. Mounted. Lynn, Mass. George Welch.
1070. Mounted. (Male.) Middleboro, Mass. J. W. P. Jenks. Dec. 3, 1855.

Mephitis mexicana, Gray.—MEXICAN SKUNK.—Mexico.

8566. Mounted. Orizaba, Mex. Mr. Botteni.

Spilogale zorilla, (Linn.) Coues.—LITTLE STRIPED SKUNK.—Western United States and Pacific Slope.

1188. Mounted. Santa Clara, Cal. Dr. J. S. Newberry. Nov., 1855.

Conepatus mapurito, (Gmelin) Coues. — WHITE-BACKED SKUNK.—Southwestern United States.

790 ÷ 1886. Skin. Western Texas. Capt. J. Pope, U. S. A.

LUTRINÆ.

Lutra canadensis, Sab.—AMERICAN OTTER.—North America generally.

3280. Mounted. Steilacoom, Wash. Ter. George Gibbs.
5145 ÷ 4456. Mounted. Washington, D. C. National Institution.

ENHYDRINÆ.

Enhydra marina, Fleming.—SEA OTTER.—Pacific Coast of the United States.

9457. Mounted. (Adult.) Alaska. Dr. T. T. Minor.
9458. Mounted. Alaska. Dr. T. T. Minor.

URSIDÆ.

Ursus horribilis, Ord.—GRIZZLY BEAR.—Western United States and Pacific Slope.

12308. Mounted. (16 years old.) Laramie, Wyoming. Major Twiss. (Confined in the Government Insane Hospital, Washington, from 1858 to 1874.)

Ursus americanus, Pallas.—BLACK BEAR.—United States generally.

12380. Mounted. Northern Michigan. John Wallace.

Thalarctos maritimus, (Linn.) Gray.—WHITE or POLAR BEAR.—Northern America, Europe and Asia.

12379. Mounted. Greenland. John Wallace.

PROCYONIDÆ.

Procyon lotor, (Linn.) Storr.—RACCOON.—United States generally.

5148. Mounted. National Institution.
5147. Mounted. National Institution.
26789. Mounted. Wyoming, N. Y. H. A. Ward. Rochester, N. Y.

Nasua fusca, .—COATIMUNDI.—Texas.

12757. Mounted. Brownsville, Texas. Dr. J. C. Merrill, U. S. A.

PINNIPEDIA.

OTARIIDÆ.

Callirhinus ursinus, (Schreber) Gray.—FUR SEAL.—North Pacific Ocean and Bering's Sea.

12918–34. Mounted. (Group of 17.) Prybilov Islands, Alaska. Alaska Commercial Company, San Francisco.
12935. Mounted. Alaska. H. W. Elliott.

Eumetopias Stelleri, (Fischer) Gray.—SEA LION.—Pacific Coast.

12489. Mounted. (Female.) Prybilov Islands, Alaska. Alaska Commercial Company, San Francisco.
12488. Mounted. (Male.) Prybilov Islands, Alaska. Alaska Commercial Co., San Francisco.
12936. Mounted. (Young.) North Pacific.

Zalophus Gilliespii, (Macbain) Gill.—THE SEA DOG.—Pacific Coast.

12937. Mounted. Southern California. Capt. Baker.

PHOCIDÆ.

PHOCINÆ.

Phoca vitulina, Linn.—THE COMMON SEAL; HARBOR SEAL.—North Atlantic.

12453. Cast. Provincetown, Mass. 1875.
623. Photograph. (Young.) U. S. Fish Commission.
624. Photograph. U. S. Fish Commission.

Phoca Richardsii, (Gray) Gill.—LEOPARD SEAL.—North Pacific.

3742. Mounted. California.
12494. Mounted. Adakh Id. Alaska. W. H. Dall.

Pagophilus grœnlandicus, (Müll.,) Gray.—HARP SEAL.—Arctic Seas.

5853. Mounted. Sable Island, N. S. P. W. Dodd.
8122. Mounted. Franklin Harbor, Arctic Seas. R. McFarlane.
5851. Mounted. Sable Island, N. S. P. W. Dodd.
12040. Mounted. St. John's, N. F. Rev. M. Harvey.
5852. Mounted. Sable Island, N. S. P. W. Dodd.
12039. Mounted. St. John's, N. F. Rev. M. Harvey.
12038. Mounted. St. John's, N. F. Rev. M. Harvey.

Erignathus barbatus, (O. Fabricius) Gill.—SQUARE-FLIPPER SEAL.—Arctic Seas.

12422. Skin. Newfoundland. Government of Newfoundland.

Histriophoca equestris, (Pallas) Gill.—BANDED SEAL.—Pacific Coast, Arctic Seas.

7580. Skin (in collection of Furs). Cape Romanzoff. W. H. Dall.

Pusa gryphus, (O. Fabricius) Gill.—GRAY SEAL.—Atlantic Coast.

8694. Mounted. Seeland. Zoological Museum, Copenhagen.

CYSTOPHORINÆ.

Cystophora cristata, (Erxl.) Nilsson.—HOODED SEAL.—Atlantic Coast.

12043. Mounted. St. John's, N. F. Rev. M. Harvey.

Macrorhinus angustirostris, Gill.—SEA ELEPHANT; ELEPHANT SEAL.—Pacific Coast.

12441. Mounted. (Male.) California. Capt. C. M. Scammon.

ROSMARIDÆ.

Rosmarus obesus, (Illig.) Gill.—WALRUS.—North Atlantic.

11870. Mounted. Greenland. Dr. I. I. Hayes.

Rosmarus Cookii, (Fremery) Gill.—WALRUS.—Northern Pacific.

12493. Mounted. Prybilov Islands, Alaska. Alaska Commercial Co., San Francisco.

ORDER, UNGULATA.

BOVIDÆ.

BOVINÆ.

Bison americanus, (Gmelin) Gray.—AMERICAN BUFFALO.—Plains between Rocky Mountains and Missouri River.

12919. Mounted. Colorado. C. E. Aiken.

Ovibos moschatus, Blainville.

12298. Mounted. (Female.) Arctic Coast, H. B. T. W. L. Hardestie. Jan. 23, 1875. Also skeleton of same animal.
12297. Mounted. (Male.) Arctic Coast, H. B. T. W. L. Hardestie. Jan. 23, 1875. Also skeleton of same animal.
6255. Mounted. (Male.) Ft. Good Hope, H. B. T. J. S. Onion.

ANTILOPINÆ.

Mazama montana, (Ord) Gill.—MOUNTAIN GOAT.—Northern Rocky Mountains of the United States and British America.

11894. Mounted. (Male.) Montana. W. F. Wheeler and J. Armitage.
11893. Mounted. Washington Territory. U. S. Northern Boundary Survey.

OVINÆ.

Ovis montana, Cuvier.—BIGHORN; MOUNTAIN SHEEP.—Rocky Mountain regions.

11891. Mounted. (Male.) Ft. Fetterman, Dakota. James Stevenson, U. S. Geol. Survey.
1608. Horns. H. B. Möllhausen.

ANTILOCAPRIDÆ.

Antilocapra americana, Ord.—PRONGHORN ANTELOPE or CABREE.—Plains west of Missouri from Lower Rio Grande to Saskatchewan.

2034. Mounted. (Male.) Yellowstone River. Dr. F. V. Hayden.
2471. Horns. Ft. Chadbourne, Texas. Dr. Swift, U. S. A.
6914. Horns. Ft. Whipple, Arizona Ty. Dr. Elliott Coues, U. S. A.
5084. Horns. Upper Missouri.?

CERVIDÆ.

Alces machlis, (Linn.) Gray.—MOOSE.—Northwestern United States.

11868. Mounted. (Adult male.) Nova Scotia. Geo. A. Boardman.
12542. Mounted. (Adult male.) Nova Scotia. Mr. Jack.
11831. Mounted. (Young calf.) Nova Scotia. Dr. Bernard Gilpin.
857. Antlers. Maine. General S. Churchill, U. S. A.
——. Antlers. Adirondacks, N. Y. Henry J. Biddle.

Tarandus rangifer, J. Brookes, subspecies **caribou,** Aud. & Bach.—WOODLAND CARIBOU.—Northeastern North America.

12473. Mounted. Houlton, Me. Rev. R. R. McLeod.
12407. Mounted. Houlton, Me. Rev. R. R. McLeod.
11865. Mounted. Lake Superior. J. Barnston.
3289. Antlers. (Female.) Nelson River.
3290. Antlers. (Female.) Nelson River.

Tarandus rangifer, (Br.) subsp. **grœnlandicus,** Br.—BARREN GROUND CARIBOU.—Arctic America.

6255. Mounted. Arctic America.
905. Antlers. North Greenland. S. Sternberg.
903. Antlers. North Greenland. S. Sternberg.
6782. Antlers. Plover Bay. Capt. C. M. Scammon, U. S. R. M.
7539. Antlers. Yukon River. W. H. Dall.
4636. Antlers. Port Foulke, N. Greenland. Dr. I. I. Hayes.

Cervus canadensis, Erxl.—AMERICAN ELK.—Northern North America.

12474. Mounted. Ft. Sanders, Wyoming. Col. A. G. Brackett, U. S. A.
4457. Antlers. Elk Co., Penna. Prof. S. S. Haldeman.
2911. Antlers. Ft. Berthold, Missouri River. Lt. Warren, U. S. A., Dr. F. V. Hayden.
867. Antlers. Utah. Col. O. Cross, U. S. A.
2579. Antlers. Platte River. Lt. Bryan, U. S. A.
3552. Antlers. Ft. Tejon, Lower Cal. John Xantus.
3551. Antlers. Ft. Tejon, Cal. John Xantus.
840. Antlers. Ft. Union, Mo. A. Culbertson.
761. Antlers. Ft. Union, Mo. A. Culbertson.
760. Antlers. Ft. Union, Mo. A. Culbertson.
2916. Antlers. Ft. Berthold, Missouri River. Lt. Warren, U. S. A., Dr. F. V. Hayden.
2905. Antlers. Ft. Berthold. Dr. F. V. Hayden.
2903. Antlers. Ft. Berthold. Dr. F. V. Hayden.
2910. Antlers. (Male.) Ft. Berthold. Dr. F. V. Hayden.
3486. Antlers. Oregon. U. S. Expl. Exped. Capt. Wilkes, U. S. N.
3487. Antlers. Oregon. U. S. Expl. Exped. Capt. Wilkes, U. S. N.

Cariacus virginianus, (Boddært) Gray.—VIRGINIA DEER.—United States east of the Missouri.

12461. Mounted. Cumberland, Md. D. P. Welpley. Dec. 26, 1875.
1889÷2587. Mounted. (Young female.) Medicine Bow River, Ark. W. S. Wood. Sept. 6, 1856.
12349. Mounted. (Albino.) Peshtigo, Wis. J. H. Leavenworth.
2909. Antlers.
763. Antlers. (Male.) Lewisburg, Pa. J. C. Barber.
4174. Antlers.
668. Antlers. (Male.) Cumberland, Md.
3386. Antlers. (Male.) Ft. Mason, Tex. Maj. G. H. Thomas.
914. Antlers. (Male.) Washington, D. C.
961. Antlers. (Male.) Arkansas. J. M. Stanley.

Cariacus virginianus, (Boddært) Gray—Continued.

3383. Antlers. (Male.) Ft. Mason, Tex. Maj. G. H. Thomas.
3387. Antlers. (Male.) Ft. Mason, Tex. Maj. G. H. Thomas.
896. Antlers. St. Louis, Mo. J. S. Bowman.
3388. Antlers. (Male.) Ft. Mason, Tex. Maj. G. H. Thomas.
667. Antlers. (Male.) Cumberland, Md.
3062. Antlers. (Male.) Essex Co., N. Y.
895. Antlers. (Male.) St. Louis, Mo. J. S. Bowman.
9843. Antlers. Near Denver, Colo. E. Palmer.
5077. Antlers. (Male.) Washington, D. C.
5083. Antlers. Upper Missouri?

Cariacus virginianus, (Bodd.) Gray, *var.* **mexicanus.**—VIRGINIA DEER.

11859. Mounted. Talamanca, Costa Rica. Prof. W. M. Gabb.

Cariacus macrotis, (Say) Gray.—MULE DEER.—Central North America.

11864. Mounted.
12583. Mounted. Cheyenne, Wyo. Capt. J. M. Gilliss, U. S. A.
6615. Antlers. Prescott, Ariz. Dr. E. Coues.
831. Antlers. Big Sioux.? T. Culbertson.
4175. Antlers.
6918. Antlers. Ft. Laramie. Col. W. O. Collins.
3682. Antlers. Mountains of New Mexico. Dr. J. S. Newberry.

Cariacus columbianus, (Rich.) Gray.—COLUMBIA BLACK-TAILED DEER.—Pacific Slope.

8154. Antlers. Puget Sound. J. G. Swan.
3203. Antlers. Whidby's Island, Puget Sound, W. T. Dr. Geo. Suckley.
5080. Antlers. Puget Sound. Dr. C. B. Kennerly.
3204. Antlers. Whidby's Island, Puget Sound. Dr. Geo. Suckley.

Cervus dama, Linn.—FALLOW DEER (introduced).

1200. Antlers. Park, Clarke Co., Va. Col. J. Fuley.
2257. Antlers. Clarke Co., Va. Col. J. Fuley.

DICOTYLIDÆ.

Dicotyles torquatus, Cuv.—PECCARY.—Red River, Arkansas, and South.

12346. Mounted. Talamanca, Costa Rica. Talamanca Exped. Prof. W. M. Gabb.

ORDER, SIRENIA.

TRICHECHIDÆ.

Trichechus manatus, Linn.—MANATEE.—Florida, West Indies, and N. E. South America.

12295. Mounted. Florida. P. T. Barnum.
16037. Skeleton. Florida. H. A. Ward.

ORDER, CETE.

DELPHINIDÆ.

DELPHINAPTERINÆ.

Delphinapterus catodon, (Linn.) Gill.—WHITE-FISH or WHITE WHALE.—Arctic and Subarctic Seas (ascending large rivers).

12490. Cast. Gulf of St. Lawrence. G. R. Renfrew & Co., Quebec.
16038. Skeleton. Gulf of St. Lawrence. G. R. Renfrew & Co.
389. Photograph. U. S. Fish Commission.

Monodon monoceros, Linn.—NARWHAL.—Arctic Seas.

15304. Tusk. Greenland. Purchased from George Y. Nickerson.

DELPHININÆ.

Leucorhamphus borealis, (Peale) Gill.—RIGHT-WHALE PORPOISE.—Pacific Coast.

—. Skeleton.

Delphinus Bairdii, Dall.—BAIRD'S PORPOISE.—California Coast.

16042. Skeleton. California. W. H. Dall.
15403. Skull. San Gabriel River, Cal. Lieut. Bergland, U. S. A.

Delphinus bombifrons, Cope.—PORPOISE.—Atlantic Coast.

12481.? Cast. New York Harbor. John Wallace.

Tursiops erebennus, (Cope) Gill.—PORPOISE.—Atlantic Coast.

15786. Skeleton. Rockaway, Long Id. Alfred Lawrence.

Tursiops Gillii, Dall.—COW-FISH.—Pacific Coast.

16043. Skeleton. California. W. H. Dall.

Lagenorhynchus perspicillatus, Cope.—SKUNK PORPOISE.—Eastern Coast.

12305. Cast. Cape Cod. Vinal N. Edwards.

Lagenorhynchus obliquidens, Gill.—STRIPED or COMMON PORPOISE.—Pacific Coast.

14329. Skeleton. California. C. M. Scammon.

Lagenorhynchus gubernator, Cope.—Eastern Coast.

——. Cast. Casco Bay, Me. U. S. Fish Commission.

Lagenorhynchus leucopleurus, (Raasch) Gray.—COW-FISH.—Eastern Coast.

12939. Cast. Cape Cod, Mass. U. S. Fish Commission.

Lagenorhynchus thicolea, Gray.—PORPOISE.—West coast of North America.

Orca atra, Cope.—KILLER.—Pacific Coast.

13018. Jaw. California. Capt. C. M. Scammon.

Orca gladiator, (Bonnaterre) Gray.—KILLER.—Atlantic Coast.

11918. Skull. South Atlantic. S. F. Baird.

Phocæna vomerina, Gill.—BAY PORPOISE.—Pacific Coast.

16044. Skeleton. California. W. H. Dall.

Phocæna lineata, Cope.—STRIPED PORPOISE.—Atlantic Coast.

621. Photograph. U. S. F. C.

Phocæna brachycion, Cope.—THE SNUFFING PIG or HERRING HOG.—Atlantic Coast.

12302. Cast. Cape Cod. Vinal N. Edwards.

GLOBICEPHALINÆ.

Globicephalus Scammoni, Cope.—BLACK-FISH.—Pacific Coast.

9076. Skull. California. Capt. C. M. Scammon.

Globicephalus intermedius, (Harlan) Gray.—BLACK-FISH.—Atlantic Coast.

12479. Cast. (Fœtus.) Cape Cod. U. S. Fish Commission.
12480. Plaster cast, (7 feet.) Cape Cod. Edwards. Nov. 14, 1874.
12480. Cast.
12840. Cast 351. Cast of head. South Dennis, Mass. U. S. Fish Commission. 1875.
12841. Cast 352. Cast of head. South Dennis, Mass. U. S. Fish Commission. 1875.

Grampus griseus, (Cuv.) Gray.—GRAMPUS; COW-FISH.—North Atlantic.

15771 ÷ 12759, 506. Cast. Dec. 2, 1875.
15772 ÷ 12760, 503. Skulls. Nov. 29, 1875.
15773 ÷ 12761, 506. Cast of head and cast of whole. Nov. 30, 1875.
506 A. Cast. (Over entrance.)
622. Photograph. U. S. Fish Commission.
12940. Cast of head. Cape Cod, Mass. V. N. Edwards.
12941. Cast of head. Cape Cod, Mass. V. N. Edwards.
12942. Cast of head. Cape Cod, Mass. V. N. Edwards.

Grampus Stearnsii, Dall.—WHITE-HEADED or MOTTLED GRAMPUS.—Pacific Coast.

13021. Skeleton. California. W. H. Dall.

ZIPHIIDÆ.

ZIPHIINÆ.

Mesoplodon Sowerbiensis, (Blainv.,) Gervais.—SOWERBY'S WHALE.—Atlantic Coast.

ANARNACINÆ.

Anarnacus semijunctus, (Cope) Gill.—BOTTLE-HEAD WHALE.—Atlantic Coast.

PHYSETERIDÆ.

PHYSETERINÆ.

Physeter macrocephalus, Linn.—SPERM WHALE.—Tropicopolitan Seas.

25052. Iron model. Made by captain of whaling ship. J. H. Thompson. New Bedford, Mass.
16046. Jaws. U. S. Fish Commission.
16047. Jaws. National Institute.
25004. Wooden model. Capt. Benj. Russell. New Bedford, Mass.

KOGIINÆ.

Kogia Floweri, Gill.—PORPOISE SPERM WHALE.—Pacific Coast.

8016. Lower jaw. Lower California.

BALÆNOPTERIDÆ.

AGAPHELINÆ.

Agaphelus gibbosus, (Cope) Cope.—SCRAGG WHALE.—Atlantic Ocean.

Rhachianectes glaucus, Cope.—GRAY WHALE.—Pacific Ocean.

13803. Skull. California. W. H. Dall.

MEGAPTERINÆ.

Megaptera versabilis, Cope.—HUMPBACK WHALE.—Pacific Coast.

13804. Vertebra. Aleutian Islands. W. H. Dall.

Megaptera osphyia, Cope.—HUMPBACK WHALE.—Atlantic Coast.

Eschrichtius robustus, Lilljeborg.—GRÄSÖ WHALE.—Atlantic Coast.

BALÆNOPTERINÆ.

Sibbaldius tectirostris, Cope.—FINBACK WHALE.—Atlantic Ocean.

16045. Skeleton. Cape Cod. U. S. Fish Commission.

Sibbaldius tuberosus, Cope.—FINBACK WHALE.—Atlantic Ocean.

Sibbaldius borealis, (Fischer) Geoffroy.—SULPHUR-BOTTOM WHALE.—Atlantic Ocean.

16039. Skeleton. Cape Cod. U. S. Fish Commission.

Sibbaldius sulfureus, Cope.—SULPHUR-BOTTOM WHALE.—Pacific Ocean.

Balænoptera rostrata, (Müller) Gray.—GRAMPUS.—Atlantic Coast.

Balænoptera velifera, Cope.—FINBACK WHALE; OREGON FINNER.—Pacific Ocean.

Balænoptera Davidsonii, Scammon.—SHARP-HEADED FINNER WHALE.—Pacific Coast.

16040. Skeleton. California. Capt. C. M. Scammon.

BALÆNIDÆ.

Balæna mysticetus, Linn.—BOWHEAD WHALE.—Arctic Seas.

12938. Model in plaster. From drawings and measurements of Capt. C. M. Scammon.
16041. Jaws. Arctic Ocean. U. S. Fish Commission.

Eubalæna Cullamach, (Chamisso) Cope.—PACIFIC RIGHT WHALE.—North Pacific.

12988. Model in plaster. From drawings and measurements of Capt. C. M. Scammon.

Eubalæna cisarctica, Cope.—RIGHT WHALE.—Atlantic Coast.

ORDER, INSECTIVORA.

TALPIDÆ.

Scalops aquaticus, (Linn.) Cuv.—Eastern United States.

3965. Mounted. (Male.) Washington, D. C. G. Exall.
5830. Mounted. (Female.) Washington, D. C. G. Exall.
3966. Mounted. District of Columbia, 1858. C. Drexler.
3964. Mounted. (Albino.) Virginia, October 30, 1846. D. F. Kent.

Scalops argentatus, Aud. & Bach.—SILVERY MOLE.—Western United States.

11351. Alcoholic. Mt. Carmel, Ill. R. Ridgway.
783. Mounted. Tremont, Ill. W. J. Shaw.

Scapanus Townsendii, (Bachman) Pomel.—OREGON MOLE.—Pacific Slope.

3963. Mounted. Oregon. T. R. Peale. U. S. Exploring Expedition.
1963. Mounted. Ft. Steilacoom, Wash. Ter. Dr. George Suckley, U. S. A.

Scapanus Breweri, (Bachman) Pomel.—HAIRY-TAILED MOLE.—Eastern United States.

823. Mounted. Cleveland, Ohio. Dr. J. P. Kirtland.

Condylura cristata, (Linn.) Illiger.—STAR-NOSED MOLE.—Northern cismontane States.

3968. Mounted. Washington, D. C.

ORDER, GLIRES.

SCIURIDÆ.

Sciurus cinereus, Linn.—FOX SQUIRREL.—Eastern United States.

4143. Mounted. District of Columbia. C. Drexler.
321 – 1240. Mounted. Western Missouri. Dr. P. R. Hoy. 1854.
4044. Mounted. (Male.) District of Columbia. A. R. Jenkins.

Sciurus carolinensis, Gmelin.—GRAY SQUIRREL.—United States.

4042. Mounted. District of Columbia. S. F. Baird.
334 ÷ 1252. Mounted. Racine, Wis. Rev. A. C. Barry.
332 ÷ 1250. Mounted. Racine, Wis. Dr. P. R. Hoy.
11071. Mounted. New York. J. G. Bell.
5844. Mounted. Washington, D. C. J. K. Townsend.

Sciurus fossor, Peale.—CALIFORNIA GRAY SQUIRREL.—Pacific Slope.

4040. Mounted. (Male.) California. Dr. Heerman.

Sciurus Abertii, Woodhouse.—TUFT-EARED SQUIRREL.—Southern Colorado, New Mexico, &c.

12576. Mounted. (Male.) Colorado Springs, Colo. C. E. Aiken.
12578. Mounted. (Male.) Colorado Springs, Colo. C. E. Aiken.
2430. Mounted. San Francisco Mts., N. M. Dr. Woodhouse.

Sciurus hudsonius, Pallas.—RED SQUIRREL; CHICKAREE.—Cismontane United States and Alaska.

12435. Mounted. (Male.) Hartford, Minn. J. H. Batty.
9241. Mounted. New Brunswick. G. A. Boardman.
3264. Mounted. Laramie Peak. J. Henman.

Tamias striatus, (Linn.) Cuv.—CHIPMUNK.—Eastern United States.

4013. Mounted. Washington, D. C. A. J. Falls.

Tamias quadrivittatus, (Say) Rich.—MISSOURI STRIPED SQUIRREL.—Pacific Slope, in mountains.

4661. Mounted. Yreka, Cal. W. Vielle.
4662. Mounted. Yreka, Cal. W. Vielle.

Tamias lateralis, (Say) Allen.—SAY'S STRIPED SQUIRREL.—Rocky Mountains, from Mexico northward.

9320. Mounted. Carson City, Nevada. U. S. Survey of Fortieth Parallel. Robert Ridgway. March, 1868.

Spermophilus grammurus, (Say) Bach.—CALIFORNIA GROUND SQUIRREL.—Western Texas and New Mexico west to Sierra Nevada Mountains.

1046÷2215. Mounted. Los Nogales, Sonora. Maj. W. H. Emory, U. S. A.

Spermophilus grammurus, (Say) Bach., *var.* **Beechyi.**—CALIFORNIA GROUND SQUIRREL.—Cala. and Lower Cala., west of Sierra Nevadas.

469. Mounted. Tejon Valley, Cal. Dr. A. L. Heerman.
470. Mounted. Tejon Valley, Cal. Dr. A. L. Heerman.

Spermophilus Harrisi, Aud. & Bach.—HARRIS' GROUND SQUIRREL.—The Great Interior Basin and Lower California.

471÷1600. Mounted. Mohave Desert. Lieut. R. S. Williamson.

Spermophilus Franklini, (Sabine) Rich.—GRAY GOPHER.—Northern Illinois, northward to the Saskatchewan.

985. Skin. Racine, Wis. Dr. P. R. Hoy.

Spermophilus tereticaudis, Aud. & Bach.—ROUND-TAILED GROUND SQUIRREL.—Arizona.

1584. Skin. Fort Yuma, Cal. Maj. G. H. Thomas.

Spermophilus tridecem-lineatus, (Mitchell) Aud. & Bach.—STRIPED GOPHER; PRAIRIE SQUIRREL.—The prairies of the United States.

437÷1303. Mounted. Head of Arkansas River. Capt. E. G. Beckwith.

Spermophilus mexicanus, (Erxleben) Wagner.—MEXICAN GROUND SQUIRREL.—Southwestern Texas and Southern New Mexico, southeastward into Mexico.

3662. Mounted. Eagle Pass, Texas. Dr. W. S. King, U. S. A.

Spermophilus Parryi, Rich.—PARRY'S MARMOT.—Northern parts of the Continent, from Hudson's Bay to Behring's Strait.

8736. Mounted. Pelly Lake. R. R. MacFarlane. June 21, 1864.
5789. Mounted. Lockhart River, H. B. T. B. R. Ross. July 4, 1860.
9366. Mounted. Kodiak. F. Bischoff. Sept. 13, 1868.

Spermophilus spilosoma, Bennett.—SONORA GROUND SQUIRREL.—Eastern base of the Rocky Mountains north to Western Wyoming.

2620. Fort Thorn, N. Mex. Dr. T. C. Henry.

Spermophilus Richardsoni, (Sabine) Baird.—YELLOW GOPHER.—Plains of the Saskatchewan southward to the Upper Missouri.

12360. Skin. Fort Saunders, Wyo. Col. A. G. Brackett.

Spermophilus Townsendi, Bach.—TOWNSEND'S GROUND SQUIRREL.—Plains of Columbia.

3775. Camp Lloyd, Utah. Capt. J. H. Simpson, U. S. A.

Spermophilus annulatus, Aud. & Bach.—RINGED GROUND SQUIRREL.—Plains of Colima, Mexico.

——. Skins.

Cynomys ludovicianus, (Ord) Baird.—PRAIRIE DOG.—Great plains east of the Rocky Mountains.

4057. Mounted. (Female.) Platte River, Ark. Dr. Woodhouse.
7770 ÷ 345. Mounted. (Male.) Ft. Larned. Dr. E. Coues. May 31, 1864.
11458. Mounted. Colorado. J. H. Batty.
9559. Mounted. Soda Springs, Colo. Jas. Stevenson.

Cynomys columbianus, (Ord) Allen.—SHORT-TAILED PRAIRIE DOG.—The parks and plains within and west of the Rocky Mountains to the plains of Columbia.

5849. Mounted. Fort Bridger, Utah. C. Drexler.

Arctomys monax, Linn.—WOODCHUCK.—Eastern North America.

26788. Mounted. Wyoming, N. Y. H. A. Ward, Rochester, N. Y.

Arctomys caligatus, Eschscholtz.—NORTHWESTERN MARMOT.—Puget's Sound northward, west of the Rocky Mountains.

9493. Mounted. Ft. Kenag, Alaska. F. Bischoff. May 16, 1869.
12485. Mounted.

Arctomys flaviventer, Aud. & Bach.—YELLOW-FOOTED MARMOT.—Rocky Mountains west of the Pacific Coast.

8834. Mounted. Fort Anderson. R. McFarlane.
12753. Mounted. Near Fort Ellis, Montana. W. B. Platt.

HAPLODONTIDÆ.

Haplodontia leporina, Rich.—SEWELLEL; SHOWT'L.—Pacific Slope (especially about Puget's Sound).

1966. Mounted. (Male.) Ft. Steilacoom, Wash. Ter. Dr. Geo. Suckley.
4046. Mounted. Puget's Sound. Ex. Ex.

CASTORIDÆ.

Castor canadensis, Kuhl.—AMERICAN BEAVER.—United States generally.

9724. Mounted. (Young.) Henry Fork, G. R. Dr. F. V. Hayden. Oct., 1870.

GEOMYIDÆ.

Geomys bursarius, Rich.—POUCHED or POCKET GOPHER.—Missouri to Minnesota and Nebraska.

91. Mounted. Columbia River, Oregon. Acad. Nat. Sci. Phila.

Geomys tuza, (Ord,) Coues.—FLORIDA SALAMANDER.—Southeastern States.

11905. Skins. Jacksonville, Fla. G. Brown Goode.

Geomys castanops, Baird.—TEXAS POUCHED GOPHER.—Texas and New Mexico.

4007. Mounted. Bent's Fork. Lt. Abert.

Thomomys talpoides, (Rich) Baird.—CALIFORNIA GOPHER.—Northern and Western North America.

366÷1280. Mounted. Monterey, California. Lt. W. P. Trowbridge.

Thomomys clusius, Coues.—SMALL-FOOTED POUCHED GOPHER.—Rocky Mountains.

——. Skins. Ft. Bridger, Utah.

MURIDÆ.

Mus decumanus, Pallas.—BROWN RAT.—United States generally. (Introduced.)

5847. Mounted. Washington, D. C.

Mus rattus, Linn.—BLACK RAT.—United States generally, but rare. (Introduced.)

12÷921. Skin. Foxburg, Pa. S. F. Baird.

Mus musculus.—COMMON MOUSE.—United States generally. (Introduced.)

4051. Mounted. (Albino.) District of Columbia.

Hesperomys leucopus, Wagner.—WHITE-FOOTED MOUSE.—Northern United States west of the Mississippi River.

1358. Mounted. Halifax, N. S. A. Downes.

Neotoma floridana, Say & Ord.—FLORIDA RAT; WOOD RAT.—Atlantic Slope northward to New York.

4334. Mounted. Hillsboro, Va. N. Janney.

Neotoma cinerea, (Ord) Baird.—ROCKY MOUNTAIN RAT.—Pacific Slope and Upper Missouri.

5665. Mounted. Fort Liard, Hudson's Bay Terr. Ross and Hardesty.

Fiber zibethicus, Cuv.—MUSK RAT.—United States generally.

4060. Mounted. (Female.) District of Columbia. R. O. Pollard.

HYSTRICIDÆ.

Erethizon dorsatus, (Linn.) Flem., *var.* **dorsatus.**—WHITE-HAIRED PORCUPINE.—Northern United States.

11086. Mounted. Maine. John Wallace.
12402. Mounted. (Female.) Mt. Washington, N. H. C. J. King. July 3, 1875.

Erethizon dorsatus, (Linn.) F. Cuv., *var.* **epixanthus.**—YELLOW-HAIRED PORCUPINE.—Pacific Slope and Upper Missouri region.

9745. Mounted. Fort Bridger, Wyoming. Dr. F. V. Hayden, U. S. Geologist. Sept. 29, 1870.

SUBORDER DUPLICIDENTATA.

LEPORIDÆ.

Lepus timidus, Fab., *var.* **arcticus.**—POLAR HARE.—Arctic and Subarctic America.

1356. Mounted. (Young.) Newfoundland. John Downes. Summer 1856.
5181. Mounted. Newfoundland. J. R. Willis.
353. Mounted. Newfoundland. J. G. Bell. Winter 1854.

Lepus americanus, Erxl., *var.* **americanus,** Allen.—NORTHERN HARE; WHITE HARE.—Northeastern North America.

12478. Mounted. Cumberland, Md. D. P. Welpley.

Lepus americanus, Erxl.—NORTHERN HARE; WHITE RABBIT.—Alaska and British North America east of the Rocky Mountains.

4430. Mounted. (Male.) Ft. Liard, H. B. T. Robert Kennicott.

Lepus americanus, *var.* **virginianus.**—VIRGINIA HARE.—Eastern United States south of Nova Scotia.

11067. Mounted. J. G. Bell.
959. Mounted. Middleboro, Mass. J. W. P. Jenks.

Lepus americanus, Erxl., *var.* **Washingtonii.**—RED HARE.—West of Rocky Mountains from Columbia River into British Columbia.

3817. Mounted. Chiloweyuck Depot, Oregon. Dr. C. B. Kennerly, U. S. A. June, 1859.

Lepus americanus, Erxl., *var.* **Bairdii.**—BAIRD'S HARE.—Higher parts of Rocky Mountains.

4265. Mounted. (Female.) Wind River Mountains. Dr. F. V. Hayden.
5882. Mounted. Head of Flathead River, Washington Ty. Dr. C. B. Kennerly, N. W. Boundary Survey. Winter 1860.
3791. Mounted. Ft. Bridger, Utah. J. H. Simpson.
303. Mounted. Shoalwater Bay. Dr. J. G. Cooper, Pacific R. R. Survey. March 5, 1854.

Lepus campestris, Bach.—PRAIRIE HARE.—Central plains of North America.

1552. Mounted. Upper Missouri. Dr. F. V. Hayden.
4240. Mounted. (Male.) Deer Creek. Dr. F. V. Hayden. Dec. 18, 1859.
69 ÷ 972. Mounted. Ft. Union, Neb. T. Culbertson.
12013. Mounted. (Male.) Frenchman's Creek, Montana. Dr. E. Coues, U. S. A., Northern Boundary Survey. July 5, 1874.

Lepus callotis, Wagler.—JACKASS HARE; JACK RABBIT.—Southwestern United States.

1170. Mounted. Klamath Lake. Dr. J. S. Newberry.
8477. Mounted. (Female.) Ft. Whipple, Arizona. Dr. E. Coues, U. S. A. May 17, 1865.
450. Mounted. Red River, Ark. Capt. Marcy.

Lepus californicus, Gray.—CALIFORNIA HARE.—California.

11070. Mounted. California. J. G. Bell.
1980. Mounted. Petaluma, California. E. Samuels.
12586. Mounted. Cape St. Lucas. John Xantus.

Lepus sylvaticus, Bach.—GRAY RABBIT.—Eastern United States.

12483. Mounted. Fairfax Co., Va. G. Brown Goode.
11069. Mounted. New York? J. G. Bell.
11068. Mounted. New York? J. G. Bell.
4017. Mounted. New York. J. G. Bell.

Lepus Bachmani, Waterhouse.—BACHMAN'S HARE.—Texas.

234; 243. Skins. Brownsville, Texas. Couch and Van Vliet.

Lepus sylvaticus, Bach., *var.* **Audubonii.**—AUDUBON'S HARE.—Southern Arizona and California.

1596. Mounted. San Diego, Cal. Dr. J. F. Hammond. Dec., 1855.
1594. Mounted. (Female.) San Diego, Cal. Dr. J. F. Hammond. Dec. 28, 1856.

Lepus sylvaticus, Bach., *var.* **Nuttalli.**—SAGE RABBIT.—United States west of 97th meridian.

8296. Mounted. (Female.) Camp Grant, Ariz. Edward Palmer. Feb. 20, 1867.

Lepus Trowbridgii, Baird.—TROWBRIDGE'S HARE.—California.

1183. Mounted. Santa Clara, Cal. Dr. J. S. Newberry, Nov., 1855.
2974 ÷ 351. Mounted. Petaluma, Cal. E. Samuels.

Lepus aquaticus, Bach.—WATER RABBIT.—Gulf States.

2306. Mounted. Prairie Mer Rouge, La. James Fairie.
2309. Mounted. Prairie Mer Rouge, La. James Fairie.

Lepus palustris, Bach.—MARSH RABBIT.—Southeastern United States, on lowlands.

4018. Mounted. St. Simon's Island, Ga. Dr. Wilson. 1860.
1256. ? Mounted. Society Hill, S. C. M. A. Curtis. 1856.
1621. Mounted. St. Simon's Island, Ga. Dr. S. M. Wilson.

ORDER, EDENTATA.

DASYPODIDÆ.

Tatusia septem-cinctus, (Linn.,) Gray.—ARMADILLO.—Southwestern United States and South.

10197. Mounted. Tobasco, Mexico. C. H. Laszlo.

ORDER, AMARSUPIALI.

DIDELPHIDÆ.

Didelphys virginiana, Shaw.—POSSUM.—United States generally.

12951. Stuffed skins. Family group of nine. Washington, D. C. G. Brown Goode.

II. BIRDS.

From want of space it has not been thought desirable to exhibit a collection of North American birds.

III. REPTILES.

ORDER, CROCODILIA.

CROCODILIDÆ.

Crocodilus americanus, Seba.—FLORIDA CROCODILE.—Southern Florida.

8384. Mounted. Biscayne Bay, Fla. Purchased from H. A. Ward.

Alligator mississippiensis, Daudin.—ALLIGATOR.—Southeastern North America.

9980. Cast. Jacksonville, Fla. F. C. Goode.
8543. Cast. Jacksonville, Fla. G. Brown Goode.

ORDER, TESTUDINATA.

TESTUDINIDÆ.

Testudo carolina, Linn.—FLORIDA GOPHER-TORTOISE.—Southeastern North America.

9627. Cast. Florida. G. Brown Goode.

Testudo Berlandieri, Agassiz.—Southwestern United States.

8926. Brownsville, Tex. Dr. J. C. Merrill, U. S. A.

EMYDIDÆ.

Malacoclemmys palustris, Gmelin.—DIAMOND-BACK TERRAPIN.—Coast from New York to Texas.

8709. Washington Market. J. W. Milner.
9028. Cast. Mandeville, La. G. Kohn.

Pseudemys rugosa, Shaw.—RED-BELLIED TERRAPIN.—New Jersey to Virginia.

8910. Cast. Kinston, N. C. J. W. Milner.

Pseudemys concinna, Leconte.—FLORIDA TERRAPIN.—Southeastern United States.

8907–8. Cast. Florida. Professor Baird.

Pseudemys mobiliensis,

9026. Cast. Mandeville, La. G. Kohn.

CHELYDRIDÆ.

Macrochelys lacertina, Schw.—ALLIGATOR TURTLE.

9211. Cast. Greenville, Miss. S. W. Ferguson.

Chelydra serpentina, Linn.—SNAPPING TORTOISE.—Canada to Ecuador.

8916. Cast. Washington, D. C. Joseph Palmer.

TRIONYCHIDÆ.

Aspidonectes ferox, Schw.—SOFT-SHELL TURTLE.—Georgia to Western Louisiana.

8708. Cast. Milledgeville, Ga. Tarleton H. Bean.
8899. Florida. Professor Baird.

Aspidonectes spinifer, Les.—SOFT-SHELL TURTLE.—Middle and northern tributaries of the Mississippi and the Saint Lawrence.

8309. Mounted. Rising Sun, Ind.
9614. Alcoholic. Mt. Carmel, Ill. R. Ridgway.

CHELONIIDÆ.

Chelonia mydas, Schw.—GREEN TURTLE.—Atlantic Coast south of Long Island.

8392÷15267. Cast in papier-maché. New York market. E. G. Blackford.

Chelonia virgata, Schw.—PACIFIC GREEN TURTLE.—Pacific Coast.

9639. Cast. San Diego, Cal. G. N. Hitchcock.

Thalassochelys caouana, Linn.—LOGGERHEAD TURTLE.

8386÷15259. Cast. New York market. E. G. Blackford.

Eretmochelys imbricata, Linn.—HAWK'S BILL TURTLE.—Southern Atlantic Coast.

——. Cast. New York market. E. G. Blackford.

Eretmochelys squamata, Linn.—PACIFIC HAWK'S BILL TURTLE.—Pacific Coast.

12388. Shells. Fiji Island. U. S. Expl. Expedition.

SPHARGIDIDÆ.

Sphargis coriacea, Rondelet.—LEATHERBACK TURTLE.—Atlantic Coast to Massachusetts.

8389–15266. Cast. New York market. E. G. Blackford.

V. FISHES.

ORDER, PEDICULATI.

MALTHEIDÆ.

Malthe cubifrons, Rich.—SEA BAT.—West Indian Fauna.

16727. Cast. St. Augustine, Fla. Dr. J. M. Laing, U. S. A.
800. Photograph. U. S. Fish Commission.

Malthe vespertilio, (Linn.) Cuv.—SEA BAT.—West Indian Fauna.

12575. Alcoholic specimen. Amazons. British Museum.

LOPHIIDÆ.

Lophius piscatorius, Linn.—GOOSE FISH; ANGLER.—Nova Scotia to Cape Hatteras.

15086. Alcoholic specimen. Tompkinsville, N. Y. Copley.
14910. Cast. Wood's Holl, Mass. U. S. Fish Commission. June 22, 1873.
16657. Cast. Wood's Holl, Mass. U. S. Fish Commission.
12, 13, 14, 15. Photographs. U. S. Fish Commission.

ANTENNARIIDÆ.

Pterophryne histrio, (Linn.) Gill.—MOUSE-FISH.—Pelagic.

20683. Alcoholic specimens. Wood's Holl, Mass. V. N. Edwards.

ORDER, PLECTOGNATHI.

MOLIDÆ.

Mola rotunda, Cuv.—SUN-FISH.—Newfoundland to Cape Hatteras.

15832. Cast. Noank, Conn. U. S. Fish Commission. Sept. 16, 1874.
15833. Cast. Noank, Conn. U. S. Fish Commission. Sept. 16, 1874.
1. Photograph. U. S. Fish Commission.
784. Color sketch. (Richard.) U. S. Fish Commission.

DIODONTIDÆ.

Chilomycterus geometricus, (Linn.) Kaup.—BUR-FISH.—South of Cape Cod; West Indian Fauna, &c.

15572. Cast. New York market. E. G. Blackford. Oct. 7, 1875.
15883. Cast. Wood's Holl, Mass. U. S. Fish Commission. Aug. 1, 1873.
523–4–5. Color sketch. (Richard.) U. S. Fish Commission.

Chilomycterus fuliginosus, (De Kay,) Gill.

13938. Alcoholic specimen. Watch Hill, R. I. U. S. Fish Commission. Sept. 18, 1874.

Trichodiodon pilosus, (Mitch.) Bleeker.—HAIRY BOX-FISH.—Cape Cod to Cape Hatteras.

——. Alcoholic specimen. Beesly's Point, N. J. Prof. S. F. Baird. 1854.

TETRODONTIDÆ.

Tetrodon lævigatus, (Linn.) Gill.—RABBIT-FISH.—Cape Cod to Florida.

14867. Cast. Vineyard Sound, Mass. U. S. Fish Commission. July 13, 1874.
2, 3. Photographs. U. S. Fish Commission.

Chilichthys turgidus, (Mitch.) Gill.—SWELL-FISH.—Cape Cod to Florida.

10740. Cast. Wood's Holl, Mass. U. S. Fish Commission.
499. Color sketch. (Richard.) U. S. Fish Commission.
615–16. Color sketch. Prof. Alex. Agassiz.

OSTRACIIDÆ.

Ostracium quadricorne, Linn.—COW-FISH.—West Indian Fauna.

10008. Cast. Bermudas. G. Brown Goode. March, 1872.
664. Color sketch. (Burkhardt.) Florida. Prof. Alex. Agassiz. Alive in Boston Aquarial Garden June, 1860.

Ostracium triquetrum, Linn.—CUCKOLD.—West Indian Fauna.

579–80. Color sketch. (Burkhardt.) Santa Cruz. Prof. Alex. Agassiz; Dr. Jeffries.

Lactophrys trigonus, (Linn.) Poey.—TRUNK-FISH.—West Indian Fauna; occasional in Massachusetts.

20610. Alcoholic specimens. Wood's Holl, Mass. V. N. Edwards.

BALISTIDÆ.

Balistes ringens, Linn.—SPOTTED FILE-FISH.—West Indian Fauna.

581. Color sketch. (Burkhardt.) Island of Sombrero, W. I. Prof. Alex. Agassiz. Sept., 1859.

Balistes vetula, Linn.—OLDWIFE; FILE-FISH.—West Indian Fauna; accidental on coast.

14909. Cast. Wood's Holl, Mass. U. S. Fish Commission. Oct. 8, 1873.
1380. Photograph. U. S. Fish Commission.

Balistes capriscus,

17233. Alcoholic specimen. East Coast. John Sutherland.

Stephanolepis setifer, (Bennet) Gill.—STORER'S FILE-FISH.—Nova Scotia to Florida.

16519. Alcoholic specimen. Wood's Holl, Mass. U. S. Fish Commission. Sept., 1875.
617. Color sketch. (Burkhardt.) Cape Cod. Prof. Alex. Agassiz. Aug., 1859.
498. Color sketch. (Richard.) Wood's Holl, Mass. U. S. Fish Commission. Aug., 1875.

Canthorhinus occidentalis.—West Indian Fauna, &c.

16746. Alcoholic specimen. Chesapeake Bay. Capt. John Evans. Oct., 1875.

Alutera cuspicauda, De Kay.—LONG-TAILED FILE-FISH.—Cape Cod to Florida.

16341. Cast. Wood's Holl, Mass. U. S. Fish Commission. Sept. 13, 1875.
15569. Cast. New York. E. G. Blackford.
15827. Cast. New York market. E. G. Blackford.
15839. Cast. New York market. E. G. Blackford. Oct. 9, 1875.
412-13-14. Color sketches. U. S. Fish Commission.

Ceratacanthus aurantiacus, (Mitch.) Gill.—ORANGE FILE-FISH.—Cape Cod to Florida.

14914. Cast. Wood's Holl, Mass. U. S. Fish Commission. Aug. 14, 1873.
15870. Cast. Wood's Holl, Mass. U. S. Fish Commission. Aug. 14, 1873.
14916. Cast. Wood's Holl, Mass. U. S. Fish Commission. Aug. 14, 1873.
5, 6, 7, 8, and 9. Photographs. U. S. Fish Commission.
500. Color sketch.

ORDER, LOPHOBRANCHII.

HIPPOCAMPIDÆ.

Hippocampus antiquorum, Leach.—SEA-HORSE; HORSE-FISH.—Cape Cod to Cape Hatteras.

21044. Alcoholic specimen. St. George's Banks. G. Brown Goode.

SYNGNATHIDÆ.

Syngnathus Peckianus, Storer.—PIPE-FISH.—Newfoundland to Cape Hatteras.

16492. Alcoholic specimen. Wood's Holl, Mass. U. S. Fish Commission.

ORDER, TELEOCEPHALI.

HETEROSOMATA.

SOLEIDÆ.

Achirus lineatus, (Linn.) Cuv.—AMERICAN SOLE; HOG CHOKER.—Cape Cod to Florida.

15743. Cast, (upper side.) Wood's Holl, Mass. U. S. Fish Commission. Feb. 21, 1874.
15743. Cast, (under side.) Wood's Holl, Mass. U. S. Fish Commission. Feb. 21, 1874.
380. Photograph. U. S. Fish Commission.
448. Photograph, (upper side.)
449. Photograph, (under side.)
561. Color sketch. Prof. Alex. Agassiz.

Solea vulgaris, Quensel.—SOLE.—Coast of Europe.

12513. Cast. England.
16. Photograph. U. S. Fish Commission.

PLEURONECTIDÆ.

Euchalarodus Putnami, Gill.—PUTNAM'S FLAT-FISH.—Found only in Salem Harbor.

5368. Alcoholic specimen. Salem, Mass. F. W. Putnam.

Pseudopleuronectes americanus, (Walb.) Gill.—FLAT-FISH; WINTER FLOUNDER.—Nova Scotia to Cape Hatteras.

14911. Cast. Wood's Holl, Mass. U. S. Fish Commission. July 22, 1873.
15692. Cast. Wood's Holl, Mass. U. S. Fish Commission. Dec., 1873.
15709. Cast. Wood's Holl, Mass. U. S. Fish Commission. Feb. 28, 1874.
14891. Cast. Wood's Holl, Mass. U. S. Fish Commission. Feb. 20, 1874.
14913. Cast. Wood's Holl, Mass. U. S. Fish Commission. Feb. 2, 1874.
15934. Cast. Wood's Holl, Mass. U. S. Fish Commission.
18, 19, 20, 21, 22, 380. Photographs. U. S. Fish Commission.
785. Color sketch. (Richard.) U. S. Fish Commission.

Myzopsetta ferruginea, (Storer) Gill.—RUSTY FLOUNDER.—Nova Scotia to Cape Cod.

15068. Cast. New York market. E. G. Blackford.
15067. Cast. New York market. E. G. Blackford. March 22, 1875.
23. Photograph. U. S. Fish Commission.
786. Color sketch. (Richard.) U. S. Fish Commission.

Pleuronectes glaber, (Storer) Gill.—SMOOTH-BACK FLOUNDER.—Northern New England Coast.

20873. Cast. Portland, Me. Tarleton H. Bean.

Glyptocephalus cynoglossus, (Linn.) Gill.—POLE FLOUNDER.—Maine.

24. Photograph. U. S. Fish Commission.
12685. Alcoholic specimen. Treat's Island, Eastport, Me. U. S. Fish Commission. Aug., 1872.

Lophopsetta maculata, (Mitch.) Gill.—WATERY FLOUNDER; SPOTTED TURBOT.—Cape Cod to Cape Hatteras.

15693. Cast. Wood's Holl, Mass. U. S. Fish Commission.
10662. Cast. Wood's Holl, Mass. U. S. Fish Commission.
25, 26. Photographs. U. S. Fish Commission.
780–1. Color sketch. (Richard.) U. S. Fish Commission.

Chænopsetta ocellaris, (De Kay) Gill.—COMMON FLOUNDER.—Cape Cod to Cape Hatteras.

15177. Cast. Norfolk, Va. U. S. Fish Commission.
10721. Cast. Wood's Holl, Mass. U. S. Fish Commission.
14899. Cast. Block Island, R. I. U. S. Fish Commission. Sept. 24, 1874.
10684. Cast. Wood's Holl, Mass. U. S. Fish Commission.
15176. Cast. Norfolk, Va. U. S. Fish Commission.
27, 28. Photographs. U. S. Fish Commission.
533–4. Color sketch. (Richard.) U. S. Fish Commission.

Chænopsetta oblonga, (Mitch.) Gill.—FOUR-SPOTTED FLOUNDER.—Cape Cod to Cape Hatteras.

10716. Cast. Wood's Holl, Mass. U. S. Fish Commission.
10661. Cast. Wood's Holl, Mass. U. S. Fish Commission.
29, 30. Photographs. U. S. Fish Commission.

Chænopsetta dentata, (Linn.) Gill.—SOUTHERN FLOUNDER.—Cape Hatteras to Florida.

18048. Alcholic specimen. St. John's River, Fla. Professor Baird.

Hippoglossus americanus, Gill.—HALIBUT.—Newfoundland to Cape Hatteras.

15698. Cast. Eastern Mass. U. S. Fish Commission. Feb. 28, 1874.
15705. Cast. Eastern Mass. U. S. Fish Commission. Feb. 28, 1874.
16587. Cast. Boston, Mass. F. H. Johnson. Sept. 24, 1875.
15732. Cast.
31, 32. Photographs. U. S. Fish Commission.
767. Color sketch. (Richard.) U. S. Fish Commission.

Hippoglossoides limandoides, Günther.—SAND DAB.

21037. Alcoholic specimen. Halifax, N. S. U. S. Fish Commission. Sept. 11, 1877.
21818. Alcoholic specimen. Gloucester, Mass. U. S. Fish Commission. July 29, 1878.
14913. Cast. Wood's Holl, Mass. V. N. Edwards. Feb. 2, 1874.

Reinhardtius hippoglossoides, (Walb.) Gill.—GREENLAND TURBOT.—Greenland.

14859. Cast, (upper side.) Newfoundland. E. G. Blackford. Feb., 1874.
14869. Cast. Newfoundland. E. G. Blackford. Feb., 1874.
33. Photograph. U. S. Fish Commission.
21564. Cast. Le Have Bank. U. S. Fish Commission.

Psettichthys melanostictus, Girard.—CALIFORNIA "SPOTTED SOLE."—Coast of California.

16701. Cast. San Francisco, Cal. L. Stone. Jan. 27, 1876.
16699. Cast. San Francisco, Cal. L. Stone. Jan. 27, 1876.
16700. Cast. San Francisco, Cal. L. Stone. Jan. 27, 1876.
16699, 16700, 16701. Alcoholic specimens. San Francisco. U. S. Fish Commission.
36, 39. Photographs. U. S. Fish Commission.
777. Color sketch. U. S. Fish Commission.
754. Color sketch. (Agassiz.) Prof. Alex. Agassiz.

Platichthys stellatus, (Pall.) Gill.—ROUGH FLOUNDER.—Coast of California.

16698. Cast. San Francisco, Cal. L. Stone.
38. Photograph. U. S. Fish Commission.
531–2. Color sketch. (Richard.) U. S. Fish Commission.
657. Color sketch. (Agassiz.) San Francisco. Prof. Alex. Agassiz. Nov., 1859.

Parophrys vetulus.—"SOLE."—Coast of California.

17064. Alcoholic specimen. San Francisco, Cal. U. S. Fish Commission.
776. Color sketch. (Richard.) U. S. Fish Commission.

Ancylopsetta quadrocellata, Gill.

17123–4. Alcoholic specimens. Charleston, S. C. Prof. S. F. Baird. March, 1877.
17123. Cast. Charleston, S. C. Prof. S. F. Baird. March, 1877.

Rhombus maximus, Will.—TURBOT.—Coasts of Europe.

12511. Cast. England. Middleton, Carman & Co.
35, 391. Photograph. U. S. Fish Commission.

Rhombus lævis, Rondel.—BRILL.—Coasts of Europe.

12512. Cast. England. Middleton, Carman & Co.
34. Photograph. U. S. Fish Commission.

ANACANTHINI.

MACRURIDÆ.

Macrurus rupestris, Bl.—ONION-FISH.—North Atlantic.

15608. Cast. St. George's Banks. E. G. Blackford. Oct. 27, 1875.
786. Color sketch. (Richard.) U. S. Fish Commission.

Macrurus Bairdii, Goode & Bean.—SPIKE-TAIL.

21014. Alcoholic specimen. (Type.) Gulf of Maine. U. S. Fish Commission. Aug. 19, 1877.

GADIDÆ.

Pollachius carbonarius, (Linn.) Bon.—POLLACK.—Greenland to Cape Hatteras.

15971. Cast. Wood's Holl, Mass. U. S. Fish Commission.
16254. Cast. Martha's Vineyard. U. S. Fish Commission. July 30, 1875.
41, 42, 43. Photographs. U. S. Fish Commission.
787. Color sketch. (Richard.) U. S. Fish Commission.

Gadus morrhua, Linn.—COD-FISH.—Polar Regions to Cape Hatteras.

16770. Cast. Irish Sea. Liverpool Free Public Museum.
14902. Cast. New York market. E. G. Blackford. April 3, 1874.
15923. Cast. Portland, Me. U. S. Fish Commission.
44, 45, 381, 392. Photographs. U. S. Fish Commission.
610. Color sketch. Prof. Alex. Agassiz.

Microgadus proximus, (Girard) Gill.—TOM COD.—Coast of California.

16696. Cast. San Francisco, Cal. L. Stone. June 27, 1876.
47. Photograph. U. S. Fish Commission.
616. Color sketch. (Agassiz.) San Francisco. Prof. Alex. Agassiz. Nov., 1859.

Microgadus tomcodus, (Walb.) Gill.—TOM COD; FROST-FISH.—Newfoundland to Cape Hatteras.

14884. Cast. Wood's Holl, Mass. U. S. Fish Commission. June 11, 1873.
14885. Cast. Wood's Holl, Mass. U. S. Fish Commission. June 11, 1873.
16608. Cast. Wood's Holl, Mass. U. S. Fish Commission. Sept. 27, 1875.
46. Photograph. U. S. Fish Commission.
662. Color sketch. (Agassiz.) Prof. Alex. Agassiz.

Melanogrammus æglefinus, (Linn.) Gill.—HADDOCK.—Newfoundland to Cape Hatteras.

14897. Cast. Wood's Holl, Mass. U. S. Fish Commission. June 18, 1873.
14896. Cast. Portland, Me. U. S. Fish Commission. Aug. 2, 1873.
48, 49, 50. Photograph. U. S. Fish Commission.
427. Color sketch. (Richard.) U. S. Fish Commission.

Phycis chuss, (Walb.) Gill.—HAKE.—Newfoundland to Cape Hatteras.

16598. Cast. Boston, Mass. F. H. Johnson.

Phycis tenuis, (Mitch.) De Kay.—SQUIRREL HAKE.—Newfoundland to Cape Hatteras.

15729. Cast. Wood's Holl, Mass. U. S. Fish Commission. June 18, 1873.
51. Photograph. U. S. Fish Commission.

Phycis Chesteri, Goode & Bean.—LONG-FINNED HAKE.

21840. Alcoholic specimen. (Type.) Gulf of Maine. U. S. Fish Commission. Aug. 27, 1878.

Urophycis regius, (Walb.) Gill.—SPOTTED CODLING.—Cape Cod to Cape Hatteras.

788. Color sketch. (Emerton.) U. S. Fish Commission.
16845–6. Casts and alcoholic specimens. New York. Fred. Mather.

Molva vulgaris, Fleming.—LING.—Polar Seas.

16775. Cast. Coast of England. Liverpool Free Public Museum.
390. Photograph. U. S. Fish Commission.

Rhinonemus caudacuta, (Storer) Gill.—FOUR-BEARDED ROCKLING.—Nova Scotia to Cape Cod.

16656. Alcoholic specimen. Wood's Holl, Mass. V. N. Edwards.

Ciliata argentata, (Reinh.) Gill.—MACKEREL MIDGE.—Greenland to Cape Hatteras.

16179. Alcoholic specimen. Vineyard Sound, Mass. U. S. Fish Commission.

Hypsiptera argentea, Günther.

21831. Alcoholic specimen. Off Cape May, N. J. Capt. R. H. Hurlbert.

Brosmius americanus, Gill.—CUSK.—Nova Scotia to Cape Cod.

16605. Cast. Boston, Mass. Wm. Prior, jr., & Co. Sept. 25, 1875.
15886. Cast. Wood's Holl, Mass. U. S. Fish Commission. Feb. 21, 1874.
52. Photograph. U. S. Fish Commission.
429. Color sketch. (Richard.) U. S. Fish Commission.

Haloporphyrus viola, Goode & Bean.—BLUE HAKE.

21837. Alcoholic specimen. (Type.) Banquereau. Capt. Jos. W. Collins. Aug., 1878.

Lota maculosa, (Les.) Rich.—BURBOT.—Fresh waters of Northern North America.

16640. Cast. New York. E. G. Blackford.
16638. New York. E. G. Blackford.
53, 54, 55. Photographs. U. S. Fish Commission.
428. Color sketch. (Richard.) U. S. Fish Commission.
491. Color sketch. (Rötter.) Prof. Alex. Agassiz.

MERLUCIIDÆ.

Merlucius bilinearis, (Mitch.) Gill.—WHITING; SILVER HAKE.—Nova Scotia to Cape Hatteras.

15747. Cast. U. S. Fish Commission.
15931. Cast. Wood's Holl, Mass. U. S. Fish Commission. Oct. 28, 1873.
56. Photograph. U. S. Fish Commission.
562. Color sketch. Prof. Alex. Agassiz.

OPHIDIIDÆ.

Ophidium marginatum, Mitch.—Cape Cod to Cape Hatteras.

10762. Alcoholic specimen. Tompkinsville, N. Y. C. Copley.

LYCODIDÆ.

Zoarces anguillaris, (Peck) Storer.—EEL POUT.—Newfoundland to Cape Hatteras.

14888. Cast. New York market. E. G. Blackford. March, 1874.
15694. Cast. Nantucket Shoals. U. S. Fish Commission.
651. Color sketch. Prof. Alex. Agassiz.

CRYPTACANTHIDÆ.

Cryptacanthodes maculatus, Storer.—SPOTTED WRY-MOUTH.—Nova Scotia to Cape Cod.

16621. Provincetown, Mass. U. S. Fish Commission.
15889. Cast. Portland, Me. U. S. Fish Commission.
15890. Cast. Portland, Me. U. S. Fish Commission.
423. Color sketch. (Richard.) U. S. Fish Commission.
613. Color sketch. (Burkhardt.) Boston. Prof. Alex. Agassiz. Dec., 1861.

Cryptacanthodes inornatus, Gill.—GHOST-FISH.—Coast of Massachusetts.

1761. Alcoholic specimen. Maine. W. Stimpson.

AMMODYTIDÆ.

Ammodytes americanus.—SAND EEL.

382. Photograph. U. S. Fish Commission.
422. Color sketch. (Richard.) U. S. Fish Commission.

STICHÆIDÆ.

Stichæus punctatus, (Fabr.) Reinh.—North Atlantic Coast.

590. Color sketch. (Burkhardt.) Prof. Alex. Agassiz.
21068. Alcoholic specimen. Halifax, N. S. U. S. Fish Commission. Sept. 4, 1877.

Eumesogrammus subbifurcatus, (Storer) Gill.—Nova Scotia to Cape Cod.

21067. Alcoholic specimen. Halifax, N. S. U. S. Fish Commission. Aug. 25, 1877.

XIPHIDIONTIDÆ.

Murænoides mucronatus, (Mitch.,) Gill.—ROCK EEL.—Nova Scotia to Cape Hatteras.

13847. Alcoholic specimen. Eastport, Me. U. S. Fish Commission.
488. Color sketch. Prof. Alex. Agassiz.

Murænoides ornatus, (Girard) Gill.—PACIFIC ROCK EEL.—Pacific Coast.

639. Color sketch. (Agassiz.) Ft. Roberts, Gulf of Georgia, Wash. Terr. Prof. Alex. Agassiz. July, 1859.

ANARRHICHADIDÆ.

Anarrhichas vomerinus, (Ag.) Storer.—WOLF-FISH.—Greenland to Cape Hatteras.

16439. Cast. Boston, Mass. F. H. Johnson. Sept. 8, 1875.
14900. Cast. Coxswain's Ledge, R. I. U. S. Fish Commission. July 25, 1875.
57. Photograph. U. S. Fish Commission.
770. Color sketch. (Richard.) U. S. Fish Commission.

Anarrhichas lupus, Linn.

21875. Specimen in brine. Gloucester. U. S. Fish Commission. 1878.

BATRACHIDÆ.

Batrachus tau, Linn.—TOAD-FISH; OYSTER-FISH.—Nova Scotia to Gulf of Mexico.

10743. Cast. Wood's Holl, Mass. U. S. Fish Commission.
501–2. Color sketch. (Richard.) U. S. Fish Commission.

Porichthys notatus.—Pacific Coast.

640. Color sketch. (Agassiz.) Simiahmoo, Wash. Terr. Prof. Alex. Agassiz. June, 1859.

URANOSCOPIDÆ.

Astroscopus anoplus, (Cuv. & Val.) Brevoort.—NAKED STARGAZER.—New York to Florida.

4622. Alcoholic specimen. Norfolk, Va. Prof. Theo. Gill.
571. Color sketch. (Burkhardt.) Pensacola, Fla. Prof. Alex. Agassiz; Dr. Jeffreys. April, 1854.
572. Color sketch. (Burkhardt.) Hampton Roads, Va. Prof. Alex. Agassiz; T. Leib. April, 1854.
584. Color sketch. (Burkhardt.) Jacksonville, Fla. Prof. Alex. Agassiz. 1853.
585. Color sketch. (Burkhardt.) Charleston, S. C. Prof. Alex. Agassiz. 1854.
586. Color sketch. (Burkhardt.) Coney Island, N. Y. Prof. Alex. Agassiz. April, 1854.

CYCLOPTERIDÆ.

Cyclopterus lumpus, Linn.—LUMP-FISH.—North Atlantic.

15688. Cast. New York. E. G. Blackford. May 15, 1874.
15730. Cast. New York. E. G. Blackford. April 18, 1874.
16660. Cast. Wood's Holl, Mass. U. S. Fish Commission.
58. Photograph. U. S. Fish Commission.
788. Color sketch. (Emerton.) Young specimen. Fisher's Island Sound. U. S. Fish Commission. Aug., 1874.

LIPARIDIDÆ.

Liparis lineata, (Lepechin) Kroyer.—STRIPED LIPARIS.—North Atlantic.

13960. Alcoholic. Watch Hill Reef, R. I. U. S. Fish Commission. Aug., 1874.
788. Color sketch. (Emerton.) U. S. Fish Commission.

Liparis Montagui, Don.—SEA SNAIL.—North Atlantic.

20432. Alcoholic. Wood's Holl, Mass. U. S. Fish Commission.

TRIGLIDÆ.

Dactylopterus volitans, (Linn.) Lacep.—FLYING GURNARD.—Temperate and Tropical Atlantic and Mediterranean.

15873. Cast. Wood's Holl, Mass. U. S. Fish Commission. Aug. 8, 1873.
——. Color sketch. (Richard.) U. S. Fish Commission.

Prionotus carolinus, (Linn.) Cuv. & Val.—BROAD-FINGERED SEA ROBIN.—Cape Cod to Florida.

59. Photograph. U. S. Fish Commission.
443. Color sketch. (Richard.) U. S. Fish Commission.
566. Color sketch. (Burkhardt.) Prof. Alex. Agassiz.

Prionotus evolans, (Linn.) Gill.—STRIPED SEA ROBIN.—Cape Cod to Florida.

15735. Cast. Wood's Holl, Mass. U. S. Fish Commission.
15727. Cast. Wood's Holl, Mass. U. S. Fish Commission.
16411. Cast. Wood's Holl, Mass. U. S. Fish Commission. Sept. 25, 1875.
60, 61, 62. Photographs. U. S. Fish Commission.
401, 402. Color sketch. (Richard.) U. S. Fish Commission.

AGONIDÆ.

Aspidophoroides monopterygius, (Bloch.) Storer.—Polar Seas and south to Connecticut.

21700. Alcoholic. Massachusetts Bay. U. S. Fish Commission.

COTTIDÆ.

Cottus octodecimspinosus, Mitch.—SCULPIN.—Nova Scotia to Cape Hatteras.

16437. Cast. Boston, Mass. F. H. Johnson. Sept. 8, 1875.
63. Photograph. U. S. Fish Commission.
537–8. Color sketch. Prof. Alex. Agassiz.

Cottus grœnlandicus, Cuv. & Val.—GREENLAND SCULPIN.—Polar Regions to Cape Cod.

16436. Cast. Boston, Mass. F. H. Johnson.
65. Photograph. U. S. Fish Commission.
545. Color sketch. Prof. Alex. Agassiz.

Cottus Mitchilli, Cuv. & Val.—PIGMY SCULPIN.—New England Coast.

14806. Alcoholic specimens. Wood's Holl, Mass. U. S. Fish Commission.
62. Photograph. U. S. Fish Commission.
546. Color sketch. Prof. Alex. Agassiz.

Uranidea viscosa, (Hald.) De Kay.—AMERICAN MILLER'S THUMB.

609. Color sketch. (Roetter.) Plymouth, Mass. Prof. Alex. Agassiz. March, 1869.

HEMITRIPTERIDÆ.

Hemitripterus americanus, (Gmel.) Cuvier.—SEA RAVEN.—Newfoundland to New York; Seas of Japan.

15736. Cast. Wood's Holl, Mass. U. S. Fish Commission.
16414. Cast. Wood's Holl, Mass. U. S. Fish Commission. Sept. 2, 1875.
66, 67. Photographs. U. S. Fish Commission.
471–2. Photographs.
476. Photograph of young.

SCORPÆNIDÆ.

Sebastes marinus, (Linn.) Lütken.—NORWAY HADDOCK; HEMDURGAN; RED PERCH.—Polar Seas and south to Cape Cod.

——. Alcoholic. Eastport, Me. U. S. Fish Commission.

Sebastes viviparus, Kroyer.—ROSE-FISH.—North Atlantic.

15879. Cast. Wood's Holl, Mass. U. S. Fish Commission.
397. Photograph. U. S. Fish Commission.
789. Color sketch. Prof. Alex Agassiz.

Sebastomus rosaceus, (Girard) Gill.—ROSY ROCK-FISH.—Coast of California.

16688. Cast. San Francisco, Cal. L. Stone.
68. Photograph. U. S. Fish Commission.

Sebastomus auriculatus, (Girard) Gill.—BLACK-EARED ROCK-FISH.—Coast of California.

612. Color sketch. (Agassiz.) San Francisco, Cal. Prof. Alex. Agassiz. Nov., 1859.

Sebastomus fasciatus, (Girard) Gill.—BANDED ROCK-FISH.—Coast of California.

483. Color sketch. (Richard.) San Francisco. Livingston Stone. U. S. Fish Commission. March, 1876.
614. Color sketch. (Agassiz.) Deep Bay, Mayne Id., W. T. Prof. Alex. Agassiz. May 20, 1859.

Sebastomus elongatus, (Girard) Gill.—Pacific Coast.

643. Color sketch. (Agassiz.) San Francisco. Prof. Alex. Agassiz. Nov., 1859.

Sebastosomus melanops, (Girard) Gill.—BLACK-HEADED ROCK-FISH.—Coast of California.

653. Color sketch. (Agassiz.) San Francisco. Prof. Alex. Agassiz. Nov., 1859.
16689. Cast. San Francisco, Cal. L. Stone.
482. Color sketch. (Richard.) U. S. Fish Commission.

Sebastodes paucispinis, (Ayres) Gill.—Coast of California.

637. Color sketch. (Agassiz.) San Francisco. Prof. Alex. Agassiz. Nov., 1859.

Chirus constellatus, (Girard) Gill.—"ROCK TROUT."—Coast of California.

16697. Cast. San Francisco, Cal. L. Stone.
69. Photograph. U. S. Fish Commission.
455. Photograph. U. S. Fish Commission.

Chirus pictus, Girard.—Pacific Coast.

642. Color sketch. (Agassiz.) San Francisco. Prof. Alex. Agassiz. Nov., 1859.

Chirus guttatus, Girard.—Coast of California.

638. Color sketch. (Agassiz.) San Francisco. Prof. Alex. Agassiz. Nov., 1859.

SCARIDÆ.

Scarus squalidus, Poey.—TAWNY PARROT-FISH.—West Indian Fauna.

973. Stuffed skin. Havana market. Prof. F. Poey.

Scarus Abildgaardii.—PARROT-FISH.—West Indian Fauna.

9738. Stuffed skin. Havana market. Prof. F. Poey.

Scarus radians, Val.—SPANISH PORGY.—West Indian Fauna.

550. Color sketch. (Burkhardt.) New Providence. Prof. Alex. Agassiz; F. S. Shaw. April, 1861.

Pseudoscarus cœruleus.—BLUE PARROT-FISH; KILMAGORE.—West Indian Fauna.

9733. Stuffed skin. Havana market. Prof. F. Poey.

LABRIDÆ.

Tautoga onitis, (Linn.) Günther.—TAUTOG; BLACK-FISH.—Bay of Fundy to South Carolina.

10598. Cast. Wood's Holl, Mass. U. S. Fish Commission.
15622. Cast. Wood's Holl, Mass. U. S. Fish Commission.
14893. Cast. Chesapeake Bay. U. S. Fish Commission. May 12.
10599. Cast. Wood's Holl, Mass. U. S. Fish Commission. May 12.
10643. Cast. Wood's Holl, Mass. U. S. Fish Commission.
15959. Cast. Wood's Holl, Mass. U. S. Fish Commission.
10599. Cast. Wood's Holl, Mass. U. S. Fish Commission.
70, 71. Photographs. U. S. Fish Commission.
450. Color sketch. (Adult.) (Richard.) U. S. Fish Commission.
451. Color sketch. (Young.) U. S. Fish Commission.
554. Color sketch. (Burkhardt.) Prof. Alex. Agassiz.
661. Color sketch. Prof. Alex. Agassiz.

Tautogolabrus adspersus, (Walb.) Gill.—CUNNER; CHOGSET.—Newfoundland to Cape Hatteras.

14894. Cast. Wood's Holl, Mass. U. S. Fish Commission.
10746. Cast. Wood's Holl, Mass. U. S. Fish Commission.
381. Photograph. U. S. Fish Commission.
383. Photograph.
645. Color sketch. Prof. Alex. Agassiz.
431–433. Color sketch. U. S. Fish Commission.

Harpe rufus (Linn.) Gill.—SPANISH LADY-FISH.—West Indian Fauna.

597. Color sketch. (Burkhardt.) Santa Cruz. Prof. Alex. Agassiz; Dr. Jeffries.

Chœrojulis radiatus, (Linn.) Goode.—BLUE-FISH.—West Indian Fauna.

596. Color sketch. (Burkhardt.) New Providence. Prof. Alex. Agassiz; F. S. Shaw. April, 1861.

Lachnolæmus falcatus, (Linn.) Val.—West Indian Fauna.

20780. Cast. Key West, Fla. E. G. Blackford.
598. Color sketch. Prof. Alex. Agassiz.
599. Color sketch. (Burkhardt.) Prof. Alex. Agassiz.
600. Color sketch. Prof. Alex. Agassiz.
601. Color sketch. Prof. Alex. Agassiz.

POMACENTRIDÆ.

Glyphidodon saxatilis, (Linn.) Cuv.—SERGEANT-MAJOR.—West Indian Fauna.

589. Color sketch. (Burkhardt.) Prof. Alex. Agassiz.
591. Color sketch. (Dall.) Bermudas. Alive in Barnum's Aquarium. Prof. Alex. Agassiz. Dec., 1862.

Pomacentrus leucostictus, M. & T.—West Indian Fauna.

21703. Alcoholic. Ft. Jefferson, Fla. Thos. Moore.

Heliastes insolatus, C. & V.—West Indian Fauna.

21704. Alcoholic. Ft. Jefferson, Fla. Thos. Moore.

EMBIOTOCIDÆ.

Embiotoca Webbi, Girard.—Coast of California.

626. Color sketch. (Agassiz.) San Francisco. Prof. Alex. Agassiz. Nov., 1859.

Embiotoca Jacksoni, Agassiz.—Coast of California.

625. Color sketch. (Agassiz.) San Francisco. Prof. Alex. Agassiz. Nov., 1859.

Tæniotoca lateralis, (Ag.) A. Ag.—STRIPED PERCH.—Coast of California.

16691. Cast. San Francisco, Cal. L. Stone.
72. Photograph. U. S. Fish Commission.
456. Photograph. U. S. Fish Commission.
658. Color sketch. (Agassiz.) Crescent City, Cal. Prof. Alex. Agassiz. May, 1859.
659. Color sketch. (Female.) (Agassiz.) San Francisco. Prof. Alex. Agassiz. Nov., 1859.
660. Color sketch. San Francisco. Prof. Alex. Agassiz. April, 1860.

Damalichthys vacca, Girard.—Coast of California.

627. Color sketch. (Agassiz.) San Francisco. Prof. Alex. Agassiz. April, 1860.

Metrogaster aggregatus, Ag.—Pacific Coast.

641. Color sketch. (Female.) (Agassiz.) San Francisco, Cal. Prof. Alex. Agassiz. Dec., 1859.

Hypsurus Caryi, Agass.—PERCH.—Pacific Coast.

606. Color sketch. San Francisco, Cal. Prof. Alex. Agassiz. April 1, 1860.

Phanerodon furcatus, Girard.—Coast of California.

636. Color sketch. (Female.) (Agassiz.) San Francisco. Prof. Alex. Agassiz. Nov., 1859.

Amphistichus argenteus, Ag.—Coast of California.

635. Color sketch. (Agassiz.) (Male.) San Francisco. Prof. Alex. Agassiz. April, 1860.

Amphistichus similis, Girard.—Coast of California.

634. Color sketch. (Agassiz.) San Francisco. Prof. Alex. Agassiz. Nov., 1859.

Rhachochilus toxotes, Agassiz.—Coast of California.

633. Color sketch. (Agassiz.) San Francisco. Prof. Alex. Agassiz. March, 1860.

Holconotus pulchellus, A. Ag.—Coast of California.

632. Color sketch. (Male.) (Agassiz.) San Francisco. Prof. Alex. Agassiz. April, 1860.

Holconotus rhodoterus, Girard.—Coast of California.

641. Color sketch. (Female.) (Agassiz.) San Francisco. Prof. Alex. Agassiz. Dec., 1859.

Hyperprosopon argenteus, Gibbon.—Coast of California.

620. Color sketch. (Female.) (Agassiz.) San Francisco. Prof. Alex. Agassiz. March, 1860.

628. Color sketch. (Female.) (Agassiz.) San Francisco. Prof. Alex. Agassiz. April, 1860.

Abeona Trowbridgii, Girard.—Coast of California.

629. Color sketch. (Female.) (Agassiz.) California. Prof. Alex. Agassiz.

TENTHIDIDÆ.

Acanthurus chirurgus, (Bl.) Schn.—DOCTOR-FISH.—West Indian Fauna.

569. Color sketch. (Burkhardt.) Florida. Prof. Alex. Agassiz. Alive in Boston Aquarial Gardens. June, 1860.

570. Color sketch. (Burkhardt.) Florida. Prof. Alex. Agassiz. Alive in Boston Aquarial Gardens. June, 1860.

Acanthurus nigricans, (Linn.) Gill.—BLACK DOCTOR-FISH.—West Indian Fauna and occasional north.

21367. Alcoholic. Bermudas. G. Brown Goode.

21698. Dried specimen. Key West, Fla. Thomas Moore. Nov., 1878.

CHAETODONTIDÆ.

Sarothrodus capistratus, (Linn.) Poey.—COQUETTE.—West Indian Fauna.

588. Color sketch. (Burkhardt.) New Providence. Prof. Alex. Agassiz; F. S. Shaw. April, 1861.

592. Color sketch. (Burkhardt.) Prof. Alex. Agassiz.

603. Color sketch. Prof. Alex. Agassiz.

Sarothrodus maculocinctus, Gill.

16955. Alcoholic specimens. Wood's Holl, Mass. U. S. Fish Commission. 1876.

Holacanthus tricolor, (Bl.) Lac.—BLACK ANGEL-FISH.—West Indian Fauna.

593. Color sketch. (Burkhardt.) Santa Cruz. Prof. Alex. Agassiz; Dr. Jeffries.

594. Color sketch. (Burkhardt.) Sombrero Id., W. I. Prof. Alex. Agassiz; S. R. Knox.

Holacanthus ciliaris, (Linn.) Lac.—ANGEL-FISH.—West Indian Fauna.

575. Color sketch. (Burkhardt.) Florida. Prof. Alex. Agassiz. Alive in Boston Aquarial Gardens. June, 1860.

576. Color sketch. (Burkhardt.) Florida. Prof. Alex. Agassiz. Alive in Boston Aquarial Gardens. June, 1860.

577. Color sketch. (Burkhardt.) Florida. Prof. Alex. Agassiz. Alive in Boston Aquarial Gardens. June, 1860.

21876. Alcoholic. Bermudas. G. Brown Goode.

583. Color sketch. (Burkhardt.) Bermudas. Prof. Alex. Agassiz. Alive in Barnum's Aquarium. 1862.

Pomacanthus arcuatus, (Linn.) Cuv.—PALOMETTA.—West Indian Fauna.

602. Color sketch. (Burkhardt.) Florida. Prof. Alex. Agassiz. Alive in Boston Aquarial Garden. June, 1860.

XIPHIIDÆ.

Xiphias gladius, SWORD-FISH.—Atlantic and Mediterranean.

16126. Cast in *papier-maché*. Off Noman's Land, Mass. U. S. Fish Commission. Aug., 1875.

21699. Sword 1⅛ inches long. Taken from nostril of *Lamna cornubica*. Gloucester, Mass. U. S. Fish Commission. Sept. 26, 1878.

Tetrapturus albidus, Poey.—SPIKE-FISH.—Cape Cod to West Indies.

15834. Cast. Wood's Holl, Mass. U. S. Fish Commission. July 23, 1873.

73. Photograph. U. S. Fish Commission.

411. Water-color sketch. U. S. Fish Commission.

Histiophorus americanus, Cuv. & Val.—SAIL-FISH.—Atlantic Coast of America.

16664. Cast. Wood's Holl, Mass. U. S. Fish Commission. Aug., 1872.

74. Photograph. U. S. Fish Commission.

TRICHIURIDÆ.

Trichiurus lepturus, Linn.—HAIR-TAIL; SCABBARD-FISH.—Temperate and Tropical Atlantic.

14874. Cast. Wood's Holl, Mass. U. S. Fish Commission.

559. Color sketch. (Burkhardt.) Prof. Alex. Agassiz.

SCOMBRIDÆ.

Scomber scombrus, Linn.—MACKEREL.—Northern Atlantic.

16443. Cast. New York market. E. G. Blackford. Sept. 10, 1875.
10604. Cast. (Male.) Washington market. S. F. Baird.
10650. Cast. Wood's Holl, Mass. U. S. Fish Commission.
10650. Cast. Wood's Holl, Mass. U. S. Fish Commission.
76, 77, 78, 393, 395. Photographs. U. S. Fish Commission.
755–6–7. Color sketches. U. S. Fish Commission.
654. Color sketch. Prof. Alex. Agassiz.

Sarda pelamys, (Linn.) Cuv.—BONITO.—Atlantic and Mediterranean.

16325. Cast. Wood's Holl, Mass. U. S. Fish Commission.
15748. Cast. New York market. E. G. Blackford.
79, 80, 81. Photographs. U. S. Fish Commission.
467–8. Color sketches. (Richard.) Wood's Holl. U. S. Fish Commission. 1875.
558. Color sketch. New York. Prof. Alex. Agassiz. Oct. 20, 1847.

Orcynus secundi-dorsalis, (Storer) Gill.—TUNNY; HORSE-MACKEREL.—Newfoundland to Florida.

16509. Cast. New York market. E. G. Blackford.
82, 83, 84. Photographs. U. S. Fish Commission.
436, 37, 96, 513. Color sketches. (Richard.) U. S. Fish Commission.

Orcynus alliteratus, (Raf.) Gill.—LITTLE TUNNY; ALBICORE.—Pelagic.

15710. Cast. Noank, Conn. U. S. Fish Commission.
15683. Cast. Noank, Conn. U. S. Fish Commission.
85. Photograph. U. S. Fish Commission.
497. Color sketch. (Richard.) U. S. Fish Commission.

Orcynus pelamys, (Linn.) Poey.—OCEANIC BONITO.—Temperate and Tropical Seas.

21852. Alcoholic. Chilmark, Mass. U. S. Fish Commission.
21562–3. Casts. Wood's Holl, Mass. U. S. Fish Commission.
21566. Alcoholic. New York market. E. G. Blackford.

Orcynus alalonga, (Gmelin) Risso.—LONG-FINNED BONITO.—Atlantic, Mediterranean.

21844. Alcoholic. Banquereau. Capt. Wm. Thompson.

Orcynus argenti-vittatus, (C. & V.) Goode & Bean?—Atlantic.

21702. Skins. Banquereau. Capt. Wm. Thompson.

Cybium maculatum, (Mitch.) Cuv.—SPANISH MACKEREL.—Atlantic shores of Tropical and Temperate America.

15367. Cast. Norfolk, Va. U. S. Fish Commission.
16407. Cast. Wood's Holl, Mass. U. S. Fish Commission.
15750. Cast. New York. E. G. Blackford.
86. Photographs. U. S. Fish Commission.
514. Color sketch. (Richard.) U. S. Fish Commission.
663. Color sketch. Prof. Alex. Agassiz.

Cybium regale, (Bl.) Cuv.—SPOTTED CERO.—West Indian Fauna and north to Cape Cod.

16622. Cast. Key West, Fla. E. G. Blackford.
87, 88, 89. Photographs. U. S. Fish Commission.
406–515. Color sketch. (Richard.) U. S. Fish Commission.
21612. Stuffed. Cuba. Prof. Felipe Poey.

Cybium caballa, Cuv. & Val.—CERO.—Atlantic Shores of Tropical and Temperate America.

16478. Cast. New York market. E. G. Blackford. Sept. 14, 1875.
90, 91, 92, 93, 94, and 95. Photographs. U. S. Fish Commission.
405–486–7. Color-sketch. (Richard.) U. S. Fish Commission.
21611. Stuffed. Cuba. Prof. Felipe Poey.

CARANGIDÆ.

Vomer setipinnis, (Mitch.) Ayres.—SILVER-FISH.—Maine to Florida. West Indian Fauna.

16915. Cast. Wood's Holl, Mass. V. N. Edwards. Sept. 7, 1873.
16615. Cast. New York. E. G. Blackford.

Argyreiosus vomer, Lac.—SILVER-FISH.—Cape Cod to Florida, and West Indian Fauna.

16475. Cast. New York. E. G. Blackford.
15905. Cast. Wood's Holl, Mass. V. N. Edwards.
96. Photograph. U. S. Fish Commission.
440, 495. Color sketches. (Richard.) U. S. Fish Commission.

Paratractus pisquetus, (Cuv. & Val.) Gill.—YELLOW CREVALLÉ.—Cape Cod to Florida.

16471. Cast. Wood's Holl, Mass. U. S. Fish Commission. Sept. 14, 1875.
15843. Cast. Wood's Holl, Mass. U. S. Fish Commission.
15888. Cast. Wood's Holl, Mass. U. S. Fish Commission.
15887. Cast. Wood's Holl, Mass. U. S. Fish Commission.
98, 99, 100. Photographs. U. S. Fish Commission.
778–9. Color sketches. (Richard.) U. S. Fish Commission.

Trachurops crumenophthalmus, (Bloch.) Gill.—BIG-EYED SCAD; GOGGLE-EYE.—Pelagic.

16481. Alcoholic. New York market. E. G. Blackford.
97. Photograph. U. S. Fish Commission.

Decapterus punctatus, (Mitch.) Gill.—ROUND ROBIN.—West Indian Fauna and north to Massachusetts.

18951. Alcoholic. Wood's Holl, Mass. U. S. Fish Commission.
21365. Alcoholic. Bermudas. G. Brown Goode.

Decapterus macarellus, (C. & V.) Gill.—MACKEREL SCAD.—West Indian Fauna and north to Massachusetts.

16239. Alcoholic specimen. Wood's Holl, Mass. U. S. Fish Commission.
21630. Alcoholic. Newport, R. I. Samuel Powel.

Carangus hippos, (Linn.) Gill.—HORSE CREVALLÉ.—Atlantic Coasts of Temperate and Tropical America, East Indian and Australian Seas.

14859. Cast. Florida. E. G. Blackford.
101. Photograph. U. S. Fish Commission.
21654. Alcoholic. Newport, R. I. Samuel Powel.

Carangus chrysos, (Mitch.) Gill.—YELLOW MACKEREL.—West Indian Fauna and north to Cape Cod.

15708. Cast. Wood's Holl, Mass. U. S. Fish Commission. Sept. 15, 1873.
15746. Cast. Wood's Holl, Mass. U. S. Fish Commission. Oct. 8, 1873.
15696. Cast. Wood's Holl, Mass. U. S. Fish Commission.
102, 103. Photographs. U. S. Fish Commission.

Blepharichthys crinitus, (Akerly) Gill.—THREAD-FISH.—West Indian Fauna and north to Cape Cod.

16520. Cast. Wood's Holl, Mass. U. S. Fish Commission. Sept. 18, 1875.
105–105. Photographs. U. S. Fish Commission.
475. Color sketch. (Richard.) U. S. Fish Commission.

Zonichthys fasciatus, (Bloch.) Sw.—BERMUDA BONITO; MED-REGAL.—Cuba, South Carolina, Bermuda.

15828. Cast. New York. E. G. Blackford.
404. Color sketch. U. S. Fish Commission.

Trachynotus carolinus, (Linn.) Gill.—POMPANO.—Atlantic Coasts of America south of Cape Cod.

15904. Cast. Norfolk, Va. U. S. Fish Commission. June 20, 1873.
15809. Cast. New York market. E. G. Blackford. October 12, 1875.
106, 107. Photographs. U. S. Fish Commission.
473–4. Color sketches. (Richard.) U. S. Fish Commission.

Trachynotus ovatus, (Linn.) Gthr.—SHORT POMPANO.—Pelagic.

16707. New York. E. G. Blackford.
400. Color sketch. (Young.) (Richard.) Vineyard Haven, Mass. U. S. Fish Commission.
547. Color sketch. (Richard.) U. S. Fish Commission.

Halatractus zonatus, (Mitch.) Gill.—BANDED RUDDER-FISH.—Cape Cod to Florida.

16472. Cast. Wood's Holl, Mass. U. S. Fish Commission. Sept. 14, 1875.
16532. Cast. Wood's Holl, Mass. U. S. Fish Commission.
108–9. Photographs. U. S. Fish Commission.
477. Color sketch. U. S. Fish Commission.
478. Color sketch. U. S. Fish Commission.
479. Color sketch. U. S. Fish Commission.

Seriola Lalandii, C. & V.?—AMBER-FISH.—Atlantic Ocean; Japan.

16709. Cast. Florida. E. G. Blackford.
110. Photograph. U. S. Fish Commission.

Oligoplites occidentalis, (Linn.) Gill.—LEATHER JACKET.—West Indies; occasional on coast.

16354. Cast. New York market. E. G. Blackford. Aug. 13, 1875.
111. Photograph. U. S. Fish Commission.
429. Color sketch. (Richard.) U. S. Fish Commission.

CORYPHÆNIDÆ.

Coryphæna Sueuri, Cuv. & Val.—DOLPHIN.—Pelagic; occasional on coast.

16441. Cast. New York market. E. G. Blackford.
——. Color sketch. (Richard.) U. S. Fish Commission.
16420. Cast. New York. E. G. Blackford.
16482. Cast. New York. E. G. Blackford.

Coryphæna punctulata, (Cuv. & Val.) Gthr.—SMALL-SPOTTED DOLPHIN.—Pelagic; occasional on coast.

16406. Cast. Noank, Conn. J. H. Latham. Aug. 25, 1875.
112, 113, and 114. Photographs. U. S. Fish Commission.

STROMATEIDÆ.

Palinurichthys perciformis, (Mitch.) Gill.—BLACK RUDDER-FISH.—Newfoundland to Cape Hatteras.

16616. Cast. Martha's Vineyard. U. S. Fish Commission. Sept. 25, 1875.
15935. Cast. Wood's Holl, Mass. U. S. Fish Commission.
544. Color sketch. (Richard.) U. S. Fish Commission.

Poronotus triacanthus, (Peck.) Gill.—HARVEST-FISH; BUTTER-FISH.—Maine to Cape Hatteras.

16591. Cast. Wood's Holl, Mass. U. S. Fish Commission.
115. Photograph. U. S. Fish Commission.
359–60–61. Color sketches. (Richard.) U. S. Fish Commission.
516–17. Color sketches.

Peprilus Gardenii, (Bl., Schn.) Gill.—SHORT HARVEST-FISH.—West Indian Fauna and north to New York.

16819. Cast. Chesapeake Bay. Sibley.
15234. New York market. John Sutherland.

LATILIDÆ.

Caulolatilus microps, Goode & Bean.—Gulf of Mexico.

20971. Alcoholic. Pensacola, Fla. Silas Stearns.

BERYCIDÆ.

Holocentrum sogo, Bloch.—SQUIRREL.—West Indian Fauna, accidental on coast; found at Newport, R. I.

578. Color sketch. (Burkhardt.) Bermudas. Prof. Alex. Agassiz. Alive in Barnum's Aquarium. Dec., 1862.
595. Color sketch. (Burkhardt.) New Providence. Prof. Alex. Agassiz; F S. Shaw. April, 1861.
21232. Alcoholic. Bermudas. J. M. Jones.

SCIAENIDÆ.

Cynoscion regalis, (Bl.) Gill.—SQUETEAGUE; WEAK-FISH.—Cape Ann to Florida.

16216. Cast. Wood's Holl, Mass. U. S. Fish Commission. July 27, 1875.
12216. Cast. Wood's Holl, Mass. U. S. Fish Commission. July 27, 1875.
116, 117, 118, 119. Photographs. U. S. Fish Commission.
469–70. Color sketches. (Richard.) U. S. Fish Commission.

Cynoscion carolinensis, (Cuv. & Val.) Gill.—SPOTTED SQUETEAGUE.—Gulf of Mexico and Southern Atlantic States.

15928. Cast.
15929. Cast.
120, 121, 122. Photographs. U. S. Fish Commission.
790. Color sketch. (Richard.) U. S. Fish Commission.

Cynoscion nothus, Holbrook.—SILVER SQUETEAGUE.—Southern Coast.

21480. Alcoholic. Pensacola, Fla. Silas Stearns.

Pogonias chromis, Lacep.—DRUM.—Cape Cod to Florida; Gulf of Mexico.

15699. Cast. Wood's Holl, Mass. U. S. Fish Commission.
15686. Cast. Fisher's Island Sound. Charles Potter. July 10, 1874.
123, 124, 125. Photographs. U. S. Fish Commission.
791. Color sketch. (Richard.) U. S. Fish Commission.
21282. Alcoholic. St. John's River, Fla. G. Brown Goode.

Haploidonotus grunniens, Raf.—FRESH-WATER DRUM.—Great Lakes and Mississippi Valley.

15701. Cast. Sandusky, Ohio. J. W. Milner. 1873.
126-127. Photographs. U. S. Fish Commission.

Liostomus obliquus, (Mitch.) De Kay.—SPOT.—Cape Cod to Florida.

15816. Cast. Norfolk, Va. U. S. Fish Commission.
15817. Cast. June 10, 1873.
141. Photograph. U. S. Fish Commission.
567. Color sketch. New York. Prof. Alex. Agassiz. Oct. 26, 1847.

Liostomus xanthurus, Lacep.—YELLOW-TAILED SPOT.—Southern Atlantic States.

142. Photograph. U. S. Fish Commission.

Bairdiella punctata, (Linn.) Gill.—SILVER-FISH; YELLOW TAIL.—Cape Cod to Florida.

143. Photograph. U. S. Fish Commission.
19060. Alcoholic. St. John's River, Florida. G. Brown Goode.

Sciaenops ocellatus, (Linn.) Gill.—RED BASS; SPOTTED BASS.—Cape Cod to Florida; Gulf of Mexico.

15463. Cast. Washington market. J. W. Milner.
15739. Cast. New York. E. G. Blackford.
128, 129, 130. Photographs. U. S. Fish Commission.
——. Oil painting. (J. H. Richard.)

Menticirrus alburnus, (Linn.) Gill.—SOUTHERN KING-FISH.—Cape Hatteras to Florida.

137. Photograph. U. S. Fish Commission.
19081. Alcoholic. St. John's River, Fla. G. Brown Goode.

Menticirrus nebulosus, (Mitch.) Gill.—KING-FISH.—Cape Cod to Florida.

16219. Cast. Wood's Holl, Mass. U. S. Fish Commission. July 27, 1875.
15579. Cast. New York market. E. G. Blackford. October 14, 1875.
15579. Cast. New York market. E. G. Blackford. October 14, 1875,
131, 132, 133, 134, 135, and 136. Photographs. U. S. Fish Commission.
508-9-10-11-12. Color sketches. (Richard.) U. S. Fish Commission.

Micropogon undulatus, (Linn.) Cuv. & Val.—CROAKER.—Atlantic Coasts of America south of Cape Cod.

15845. Cast. Norfolk, Va. U. S. Fish Commission. June 19, 1873.
15810. Cast. Norfolk, Va. U. S. Fish Commission. July 18, 1873.
138, 139, 140. Photographs. U. S. Fish Commission.
19056. Alcoholic. St. John's River, Fla. G. Brown Goode.

GERRIDÆ.

Eucinostomus argenteus, B. & G.—Cape Cod and southward.

16960. Alcoholic. Wood's Holl, Mass. U. S. Fish Commission.

Eucinostomus Lefroyi, Goode.—BERMUDA SHAD.—West Indian Fauna.

21358. Alcoholic. Bermudas. G. Brown Goode.

PIMELEPTERIDÆ.

Pimelepterus Boscii, Lacep.—BREAM.—West Indian Fauna and north to Cape Cod.

20844. Alcoholic. Newport, R. I. S. Powell.
20635. Alcoholic. Wood's Holl, Mass. U. S. Fish Commission.
21368. Alcoholic. Bermudas. G. Brown Goode.

SPARIDÆ.

Lagodon rhomboides, (Linn.) Holbrook.—SAILOR'S CHOICE.—West Indian Fauna and north to Cape Cod.

21280. Alcoholic. St. John's River, Fla. G. Brown Goode.

Archosargus probatocephalus, (Walb.) Gill.—SHEEPSHEAD.—Cape Cod to Florida; Gulf of Mexico.

10685. Cast. Washington market. J. W. Milner.
15825. Cast. New York market. E. G. Blackford. October 20, 1875.
15826. Cast. New York market. E. G. Blackford. October 14, 1875.
14880. Cast. Norfolk, Va. U. S. Fish Commission. July 11, 1872.
15818. Cast. New York. E. G. Blackford.
144, 145. Photographs. U. S. Fish Commission.
548. Color sketch. (Richard.) U. S. Fish Commission.

Stenotomus argyrops, (Linn.) Gill.—SCUPPAUG; SCUP; PORGY.—Cape Ann to Florida.

16035. Cast. Buzzard's Bay. U. S. Fish Commission. July 10, 1875.
10668. Cast. Wood's Holl, Mass. V. N. Edwards.
16209. Cast.
10601. Cast. Wood's Holl, Mass. V. N. Edwards.
146–47. Photographs. U. S. Fish Commission.
439. Color sketch. (Young.) (Richard.) U. S. Fish Commission.

Sargus Holbrookii, Bean.—CHARLESTON BREAM.—Carolinas.

20979. Cast. Charleston, S. C. G. Brown Goode.

Sparus aculeàlus, (Cuv. & Val.) Gill.?—BASTARD SNAPPER.—Southern Coast.

20981. Cast. Charleston, S. C. G. Brown Goode.

PRISTIPOMATIDÆ.

Hæmylum arcuatum, Cuv. & Val.—BLUE-CHECKED RED-MOUTH.—South Atlantic Coast of United States.

14907. Cast. Florida. E. G. Blackford.

Hæmylum formosum, (Linn.) Cuv.—SQUIRREL RED-MOUTH.—South Atlantic Coast of United States.

15846. Cast. Florida. E. G. Blackford.

Hæmylum, sp.—South Atlantic Coast of United States.

15840. Cast. Florida. E. G. Blackford.

Hæmylum chrysopterum, (Linn.) Cuv.?—YELLOW-FINNED GRUNT.—South Atlantic Coast of United States.

15918. Cast. Florida. E. G. Blackford.

Hæmylum elegans, Cuv. & Val.—BLUE-STRIPED RED-MOUTH.—South Atlantic Coast of United States.

15815. Cast. Florida. E. G. Blackford.
573. Color sketch. (Dall.) Florida. Prof. Alex. Agassiz. Alive in Boston Aquarial Garden. June, 1860.
574. Color sketch. (Burkhardt.) Bermudas. Prof. Alex. Agassiz. Alive in Barnum's Aquarium. Nov. 1862.

Hæmylum arara, Poey?—ARARA RED-MOUTH.—West Indian Fauna.

552. Water-color sketch. (Burkhardt.) Florida. Prof. Alex. Agassiz. Alive in Boston Aquarial Garden. June, 1860.

Orthopristis fulvomaculatus, (Mitch.) Gill.—SPECKLED GRUNT.—South Atlantic Coast of United States.

15812. Cast. Norfolk, Va. U. S. Fish Commission.
15814. Cast. Norfolk, Va. U. S. Fish Commission.
15908. Cast.

Anisotremus virginicus, (Linn.) Gill.—South Atlantic Coast of United States.

15903. Cast. Florida. E. G. Blackford. April 16, 1874.
148. Photograph. U. S. Fish Commission.
551. Color sketch. (Burkhardt.) New Providence. Prof. Alex. Agassiz; F. S. Shaw. April, 1861.

Lutjanus Blackfordii, Goode & Bean.—RED SNAPPER.—West Indian Fauna and north to Savannah Bank.

15700. Cast. New York market. E. G. Blackford. May 7, 1874.
12515. Cast. Washington market. J. W. Milner.
149. Photograph. U. S. Fish Commission.

Lutjanus, sp.—SNAPPER.—West Indian Fauna and Southern Atlantic States.

15917. Cast. Florida. E. G. Blackford.

Lutjanus, sp.—South Atlantic Coast of United States.

16641. Cast. Key West, Fla. E. G. Blackford.

Lutjanus caxis, (Bl., Schn.) Gill.—GRAY SNAPPER.—West Indian Fauna and Southern Atlantic States.

18101. Alcoholic. Bermudas. G. Brown Goode.

Lutjanus Stearnsii, Goode & Bean.—GULF SNAPPER.—Gulf of Mexico.

21330. Cast. Pensacola, Fla. Silas Stearns.

Rhomboplites, aurorubcus, (Cuv. & Val.) Gill.—MANGROVE SNAPPER.—West Indian Fauna.

21224. Alcoholic. Charleston, S. C. C. C. Leslie.
21338. Alcoholic. Pensacola, Fla. Silas Stearns.

Ocyurus chrysurus, (Bl.) Gill.—GOLDEN TAIL.—West Indian Fauna.

14905. Cast. New York market. Florida. E. G. Blackford. April 16, 1874.
150. Photograph. U. S. Fish Commission.
555. Color sketch. (Burkhardt.) New Providence. Prof. Alex. Agassiz; F. S. Shaw. April, 1861.

CENTRARCHIDÆ.

Eupomotis aureus, (Walb.) Gill & Jordan.—SUN-FISH.—Fresh waters of Eastern North America.

14941. Cast. Washington market. G. Brown Goode. February, 1875.
151, 152. Photograph. U. S. Fish Commission.
505. Color sketch. (Richard.) U. S. Fish Commission.

Lepiopomus pallidus, (Mitch.) Gill & Jordan.—BLUE-NOSE BREAM.—Great Lakes and Southeastern United States.

18368. Alcoholic. St. John's River, Fla. G. Brown Goode.

Pomoxys nigromaculatus, (Les.) Girard.—GRASS BASS.—Great Lakes, Mississippi Valley, and Southern Atlantic States.

10382. Cast. Norfolk, Va. Dr. H. C. Yarrow.
153, 154. Photograph. U. S. Fish Commission.

Ambloplites rupestris, (Raf.) Gill.—ROCK BASS.—Great Lakes and Mississippi Valley.

15958. Cast. U. S. Fish Commission.
151. Photograph. U. S. Fish Commission.

Micropterus pallidus, (Raf.) Gill & Jordan.—LARGE-MOUTH BLACK BASS.—Great Lakes, Mississippi River and tributaries; Southern States; introduced northward.

10380. Cast. Norfolk, Va. Dr. H. C. Yarrow.
10668. Cast. Norfolk, Va. U. S. Fish Commission. Nov. 5, 1873.
10381. Cast. Norfolk, Va. Dr. H. C. Yarrow.
15880. Cast. Carrollton, Ky. J. W. Milner.
10380. Cast. Norfolk, Va. Dr. H. C. Yarrow.
155, 156. Photographs. U. S. Fish Commission.

Micropterus salmoides, (Lac.) Gill.—SMALL-MOUTHED BLACK BASS.—Great Lakes and Mississippi Valley; introduced eastward.

15297. Cast. Potomac River. Maj. Hobbs.

PERCIDÆ.

Perca fluviatilis, L.—YELLOW PERCH.—Fresh waters of Eastern United States and Western Europe.

14976. Cast. Washington market. G. Brown Goode. Feb. 27, 1875.
167, 168, 169. Photographs. U. S. Fish Commission.
792. Color sketch. (Richard.) U. S. Fish Commission.

Stizostedium vitreum, (Mitch.) Jordan & Copeland, (Val.) Cope.—YELLOW PIKE-PERCH.—Fresh waters of Central United States.

15658. Cast. New York market. E. G. Blackford.
14862. Cast. Sandusky, Ohio. J. W. Milner. Oct., 1873.
611. Color sketch. (Roetter.) Sackett's Harbor, N. Y. Prof. Alex. Agassiz. Nov., 1868.
15658. Cast. New York market. E. G. Blackford. Nov. 5, 1875.
170, 171, 172, 173, 174. Photographs. U. S. Fish Commission.
793. Color sketch. (Richard.) U. S. Fish Commission.

Stizostedium canadense, (Smith) Jordan.—CANADA PIKE-PERCH.—St. Lawrence River to the Upper Missouri.

178. Photograph. U. S. Fish Commission.
15752. Cast. Ohio River. J. W. Milner.
15837. Cast.
175, 176, 177. Photographs. U. S. Fish Commission.

SERRANIDÆ.

Epinephelus morio, (Cuv.) Gill.—RED-BELLIED SNAPPER.—West Indian Fauna and Southern Atlantic States.

12516. Cast. Washington market. J. W. Milner.
165. Photograph. U. S. Fish Commission.

Epinephelus, sp.—SNAPPER.—West Indian Fauna and Southern Atlantic States.

14923. Cast. Florida. E. G. Blackford.

Epinephelus Drummond-Hayi, Goode & Bean.—STAR SNAPPER; HIND; JOHN PAW.—West Indian Fauna.

16795. Cast. South Florida. E. G. Blackford.
21255. Alcoholic. Pensacola, Fla. Silas Stearns.
——. Color sketch. Bermuda. Col. H. Drummond-Hay.

Epinephelus nigritus, Holbrook.—BLACK GROUPER.—Coast of Florida.

21239. Cast. Pensacola, Fla. Silas Stearns.

Epinephelus striatus, (Bloch.) Gill.—HAMLET; GROUPER.—West Indian Fauna.

18088. Alcoholic. Bermudas. G. Brown Goode.
582. Color sketch. (Burkhardt.) Bermudas. Prof. Alex. Agassiz. Alive in Barnum's Aquarium. Nov., 1862.

Epinephelus guttatus, (Gmel.) Goode.—BERMUDA HIND.—West Indian Fauna.

18118. Alcoholic. Bermudas. G. Brown Goode.
587. Color sketch. (Burkhardt.) Bermudas. Prof. Alex. Agassiz. Alive in Barnum's Aquarium. Nov., 1862.

Trisotropis undulosus, (Cuv.) Gill.?—ROCK GROUPER.—Cape Hatteras to Florida; West Indian Fauna.

15462. Cast. New York market. E. G. Blackford. June 14, 1875.
15881. Cast. New York market. E. G. Blackford. June 14, 1875.
794. Color sketch. (Richard.) U. S. Fish Commission.

Promicrops guasa, (Poey) Gill.—JEW-FISH; GUASA.—West Indian Fauna.

15305. Cast. Key West. E. G. Blackford.
444. Color sketch. (Richard.) U. S. Fish Commission.

Centropristis atrarius, (Linn.) Bârn.—SEA BASS.—Cape Cod to Florida.

10642. Cast. Wood's Holl, Mass. U. S. Fish Commission.
10597. Cast. Wood's Holl, Mass. U. S. Fish Commission. May 12, 1874.
15684. Cast. (Male.) Noank, Conn. U. S. Fish Commission. August, 1874.
15685. Cast. Wood's Holl, Mass. U. S. Fish Commission. September 2, 1875.
10667. Cast. (Female.) Wood's Holl, Mass. U. S. Fish Commission.
15963. Cast. Hog-fish Rocks, Va. U. S. Fish Commission. July 5, 1873.
157, 158, 159, 160, 161, 162, 163, 164, 381. Photographs. U. S. Fish Commission
463–4 and 5. Color sketches. (Richard.) U. S. Fish Commission.

Diplectrum fasciculare, (Cuv. & Val.) Holb.—SQUIRREL.—Cape Hatteras to Florida; West Indian Fauna.

15844. Cast. New York. E. G. Blackford.
166. Photograph. U. S. Fish Commission.

LABRACIDÆ.

Roccus lineatus, (Schn.) Gill.—STRIPED BASS; ROCK-FISH.—St. Lawrence to Florida.

10664. Cast. (Female.) Potomac River. Dr. H. C. Yarrow.
15737. Cast. Wood's Holl, Mass. U. S. Fish Commission. May 27, 1873.
15725. Cast. Washington market. G. Brown Goode.
15706. Cast. New York. E. G. Blackford. Nov. 28, 1874.
185–186, 187. Photographs. U. S. Fish Commission.
782–3. Color sketch. (Richard.) U. S. Fish Commission.

Roccus chrysops, (Raf.) Gill.—WHITE BASS.—Great Lakes and Mississippi Valley.

15807. Cast. New York market. E. G. Blackford. Oct. 7, 1875.
188. Photographs. U. S. Fish Commission.
503. Color sketch. (Richard.) U. S. Fish Commission.

Morone americana, (Gmel.) Gill.—WHITE PERCH.—Nova Scotia to Florida.

10748. Cast. Wood's Holl, Mass. U. S. Fish Commission.
10729. Cast. (Female.) Wood's Holl, Mass. U. S. Fish Commission.
10730. Cast. Wood's Holl, Mass. U. S. Fish Commission.
16618. Cast. Wood's Holl, Mass. U. S. Fish Commission.
179, 180, 181, 182, 183, 184. Photographs. U. S. Fish Commission.
766. Color sketch. (Richard.) U. S. Fish Commission.

EPHIPPIIDÆ.

Parephippus quadratus, (Gun.) Gill.—MOON-FISH.—Cape Cod to Florida; West Indian Fauna.

14886. Cast. Norfolk, Va. U. S. Fish Commission. July, 1873.
14887. Cast. Norfolk, Va. U. S. Fish Commission. July, 1873.
15820. Cast. Norfolk, Va. U. S. Fish Commission.
196, 197. Photographs. U. S. Fish Commission.

LOBOTIDÆ.

Lobotes surinamensis, Cuv.—TRIPLE-TAIL FLASHER.—Cape Cod to Florida; West and East Indies.

15702. Cast. Wood's Holl, Mass. U. S. Fish Commission. August 28, 1873.
16202. Cast. New York market. E. G. Blackford. July 20, 1875.
201, 202. Photographs. U. S. Fish Commission.

POMATOMIDÆ.

Pomatomus saltatrix, (Linn.) Gill.—BLUE-FISH.—Pelagic.

15871. Cast. Wood's Holl, Mass. V. N. Edwards. June 11, 1873.
13166. Cast. Norfolk, Va. G. Brown Goode.
15753. Cast.
189, 190, 191, 192, 193, 194, 195, 386. Photographs. U. S. Fish Commission.
528-2-30. Color sketches. (Richard.) U. S. Fish Commission.

ELACATIDÆ.

Elacate canadus, (Linn.) Gill.—COBIA; CRAB-EATER.—Cape Cod to West Indies.

16250. Cast. New York market. E. G. Blackford. July 30, 1875.
14922. Cast. Point Lookout, Va. J. H. Skidmore. July 9, 1874.
198, 199, 200. Photographs. U. S. Fish Commission.

PRIACANTHIDÆ.

Pseudopriacanthus altus, (Gill) Bleeker.—SHORT BIG-EYE.—Cape Cod to Cape Hatteras.

203. Photograph. U. S. Fish Commission.
441. Color sketch. (Richard.) U. S. Fish Commission.
15583. Alcoholic. Wood's Holl, Mass. U. S. Fish Commission. Sept., 1875.
16954. Alcoholic. Wood's Holl, Mass. U. S. Fish Commission. 1876.

ECHENEIDIDÆ.

Leptecheneis naucrateoides, (Zuiew.) Gill.—REMORA; SUCKER-FISH.—Coast generally.

16071. Cast. Wood's Holl, Mass. U. S. Fish Commission. July 10, 1875.
16617. Cast. Wood's Holl, Mass. U. S. Fish Commission. Sept. 18, 1875.
16344. Cast. Wood's Holl, Mass. U. S. Fish Commission. Aug. 10, 1875.
206, 207, 208. Photographs. U. S. Fish Commission.
541-2-3. Color sketch. (Richard.) U. S. Fish Commission.

Remoropsis brachyptera, (Lowe) Gill.—SWORD-FISH SUCKER.—Parasite of the Sword-fish (*Xiphias gladius*).

21693. Alcoholic. Sable I'd Bank. Capt. G. A. Johnson.

Rhombochirus osteochir, (Cuv.) Gill.—SPEAR-FISH SUCKER.—Parasites of the Bill-fish (*Tetrapturus albidus*).

15842. Cast. Wood's Holl, Mass. U. S. Fish Commission.
209, 210, 211. Photographs. U. S. Fish Commission.
764-5. Color sketches. (Richard.) U. S. Fish Commission.

SPHYRÆNIDÆ.

Sphyræna borealis, De Kay.—NORTHERN BARRACUDA.—Cape Cod to Florida.

14978. Cast. Florida. E. G. Blackford.
204, 205. Photographs. U. S. Fish Commission.
407. Color sketch. (Richard.) U. S. Fish Commission. Probably identical with *Sphyræna spet* (Hauy) Goode, the common species of the Mediterranean.

Sphyræna picuda.—SOUTHERN BARRACUDA.—West Indian Fauna, &c.

21886. Alcoholic. Bermudas. G. Brown Goode.

PERCESOCES.

MUGILIDÆ.

Mugil lineatus, Mitch.—STRIPED MULLET.—Cape Cod to Florida; Gulf of Mexico.

15723. Cast.
212, 213, 214, 215, 216. Photographs. U. S. Fish Commission.
421. Color sketch. (Richard.) U. S. Fish Commission.

Mugil albula, Linn.—WHITE MULLET.—Cape Cod to Florida (probably young of the preceding species).

420. Color sketch. (Richard.) U. S. Fish Commission.
21302. Alcoholic. Florida. G. Brown Goode.

ATHERINIDÆ.

Chirostoma notatum, (Mitch.) Gill.—SILVER-SIDES; FRIAR.—Maine to Florida.

14930. Cast.
16612. Cast.
16620. Cast. Wood's Holl, Mass. U. S. Fish Commission.
380, 382. Photographs. U. S. Fish Commission.
518. Color sketch. (Richard.) U. S. Fish Commission.

Chirostoma californiensis, (Girard) Gill.—"SMELT."—Coast of California.

506. Color sketch. (Richard.) U. S. Fish Commission.
16693. Alcoholic. San Francisco. Livingston Stone.
16693. Cast. San Francisco. U. S. Fish Commission.

HEMIBRANCHII.

GASTEROSTEIDÆ.

Pygosteus occidentalis, (Cuv. & Val.) Brevoort.—TEN-SPINED STICKLE-BACK.—Newfoundland to Cape Hatteras.

384. Photograph. U. S. Fish Commission.
644. Color sketch. (Burkhardt.) Prof. Alex. Agassiz.

Gasterosteus noveboracensis, Cuv. & Val.—NEW YORK STICKLE-BACK.—New Brunswick to Cape Hatteras.

644. Color sketch. (Burkhardt.) Prof. Alex. Agassiz.

Apeltes quadracus, (Mitch.) Brev.—FOUR-SPINED STICKLE-BACK.—New Brunswick to Florida.

384. Photograph. U. S. Fish Commission.
644. Color sketch. (Burkhardt.) Prof. Alex. Agassiz.
Many other species of Gasterosteus are included in the series, which were not of sufficient importance to be enumerated.

AULOSTOMIDÆ.

Aulostoma maculatum, Val.—TRUMPET-FISH.—West Indian Fauna.

568. Color sketch. (Burkhardt.) Prof. Alex. Agassiz.

FISTULARIIDÆ.

Fistularia serrata, Cuv.—TOBACCO-PIPE-FISH.—Cape Cod to Florida; West Indian Fauna.

16957. Alcoholic. Wood's Holl, Mass. U. S. Fish Commission. 1876.

SYNENTOGNATHI.

BELONIDÆ.

Belone longirostris, (Mitch.) Gill.—SILVER GAR-FISH.—Cape Cod to Florida.

16555. Cast. Wood's Holl, Mass. U. S. Fish Commission. Sept. 21, 1875.
16423. Cast. Wood's Holl, Mass. U. S. Fish Commission. Sept. 6, 1875.
217. Photograph. U. S. Fish Commission.
563. Color sketch. Prof. Alex. Agassiz.
540. Color sketch. (Richard.) U. S. Fish Commission.

Belone latimanus, Poey.—SILVER GAR-FISH.—Cape Cod to Florida.

16121. Cast. Wood's Holl, Mass. U. S. Fish Commission. July 15, 1875.
795. Color sketch. (Richard.) U. S. Fish Commission.
218. Photograph. U. S. Fish Commission.

Belone hians, Cuv. & Val.—BOW-MOUTHED GAR-FISH.—West Indian Fauna.

21810. Alcoholic. New York market. G. Brown Goode.

Belone Jonesii, Goode.—HOUND-FISH.—West Indian Fauna.

21392. Alcoholic. Bermudas. G. Brown Goode.

SCOMBERESOCIDÆ.

Exocœtus exiliens, Gmel.—BUTTERFLY FLYING-FISH.—West Indian Fauna and north to Cape Cod.

21410. Alcoholic. Bermudas. G. Brown Goode. Mar., 1872.

Exocœtus noveboracensis, Mitch.?—BLACK-WINGED FLYING-FISH.—Cape Cod to Florida.

——. Alcoholic. Block Island, R. I. U. S. Fish Commission. Aug., 1874.

Exocœtus Rondeletii, Cuv. & Val.—Mediterranean and Atlantic.

21409. Alcoholic. Bermudas. G. Brown Goode.

Cypselurus furcatus, (Mitch.) Weinland.—BEARDED FLYING-FISH.—Atlantic.

21412. Alcoholic. Bermudas. G. Brown Goode.

Euleptorhamphus longirostris, (Cuv. & Val.) Gill.—Cape Cod to Florida.

15648. Alcoholic. Newport, R. I. Mr. Brown.

Scomberesox scutellatus, Les.—HALF-BEAK; SKIPPER.—Nova Scotia to Florida.

13164. Cast.
410, 539. Color sketches. (Richard.) U. S. Fish Commission.

HAPLOMI.

ESOCIDÆ.

Esox americanus, Gmelin.—BROOK PICKEREL.—Massachusetts to Maryland.

17766. Alcoholic. Keeseville, N. Y. H. N. Hewitt.
796. Color sketch. (Richard.) U. S. Fish Commission.
493. Color sketch. Prof. Alex. Agassiz.

Esox reticulatus, Lesueur.—PICKEREL.—Atlantic slope, New England to Alabama.

15012. Cast. Washington, D. C. G. Brown Goode.
222. Photograph. U. S. Fish Commission.
758. Color sketch. U. S. Fish Commission.
619. Color sketch. (Roetter.) East Wareham, Mass. Museum of Comp. Zoology. Feb., 1869.

Esox lucius, Linn.—PIKE.—Northern America, Asia, and Europe.

14876. Cast. Sandusky, Ohio. J. W. Milner. Oct. 25, 1873.
14875. Cast. Sandusky, Ohio. J. W. Milner. Nov. 3, 1873.
219. Photograph. U. S. Fish Commission.
618. Color sketch. (Roetter.) Museum of Comp. Zoology. Sackett's Harbor. Nov., 1869.
494. Color sketch. Prof. Alex. Agassiz.

Esox nobilior, Thompson.—MUSKELLUNGE (weight 37 pounds).—Great Lakes and Southern British Provinces east of Rocky Mountains.

14895. Cast. Sandusky, Ohio. J. W. Milner. Oct., 1873.
220, 221. Photographs. U. S. Fish Commission.

CYPRINODONTIDÆ.

Cyprinodon variegatus, Lac.—SHORT CYPRINODON.—Cape Cod to Florida.

13986. Alcoholic. Noank, Conn. U. S. Fish Commission.

Fundulus pisculentus, (Mitch.) Val.—MUMMICHOG.—Nova Scotia to Florida.

13970. Alcoholic. Noank, Conn. U. S. Fish Commission.
434, 797. Color sketches. (Richard.) U. S. Fish Commission.

Hydrargyra majalis, (Walb.) Val.—MAY-FISH.—Brackish waters; Cape Ann to Cape Hatteras.

223–383. Photographs. U. S. Fish Commission.
13974. Alcoholic. Noank, Conn. U. S. Fish Commission.
434. Color sketch. (Richard.) U. S. Fish Commission.

ISOSPONDYLI.

SYNODONTIDÆ.

Synodus fœtens, (Linn.) Gill.—SNAKE-FISH.—Cape Cod to Florida.

16583. Cast. New York market. E. G. Blackford. Sept. 24, 1875.
424. Color sketch. (Richard.) U. S. Fish Commission.

MICROSTOMIDÆ.

Mallotus villosus, (Müll.) Cuv.—CAPELIN.—Polar Seas and south to Nova Scotia.

3417. Alcoholic. Gross Water Bay. Dr. E. Coues.

Osmerus pacificus, (Rich.)—OULACHAN; CANDLE-FISH.—North Pacific.

20584. Alcoholic. Washington Ter. U. S. Fish Commission.

Osmerus mordax, (Mitch.) Gill.—SMELT; FROST-FISH.—Nova Scotia to Cape Hatteras.

385. Photograph. U. S. Fish Commission.
507. Color sketch. (Richard.) U. S. Fish Commission.
13863. Alcoholic. Eastport, Me. U. S. Fish Commission.

Argentina syrtensium, Goode & Bean.—WESTERN ARGENTINE.—Deep-sea Fauna of Western Atlantic.

21624. Alcoholic. Sable Island Bank. Capt. J. W. Collins.

COREGONIDÆ.

Coregonus clupeiformis, (Mitch.) Milner. — WHITE-FISH.— Great Lakes and British America.

16741. Cast. Michigan.
14973. Cast. Ecorse, Mich. George Clark.
15741. Cast. Ecorse, Mich. George Clark.
14864. Cooperstown, N. Y. Elihu Phinney.
224, 225, 226, 227, 228, 229, 230. Photographs. U. S. Fish Commission.

Coregonus labradoricus, Rich.—LAKE WHITING.—Northern Lakes.

232. Photograph. U. S. Fish Commission.
16868. Alcoholic. Lake Winnepiseogee, Me. U. S. Fish Commission.

Prosopium quadrilaterale, (Rich.) Milner.—"SHAD-WAITER." —Great Lakes and northward.

233. Photograph. U. S. Fish Commission.
12360. Alcoholic. Grand Lake, Me. U. S. Fish Commission.

Prosopium Couesii, Milner.—CHIEF MOUNTAIN LAKE WHITE-FISH.—Upper Missouri Region.

14146. Alcoholic. Chief Mountain Lake. Dr. Elliott Coues, U. S. A.

Argyrosomus Artedi, (Les.) Hoy.—HERRING WHITE-FISH.— Great Lakes, etc.

235. Photograph. U. S. Fish Commission.
752. Color sketch. (Richard.) U. S. Fish Commission.
11195. Alcoholic. Au Sable, Michigan. U. S. Fish Commission.

SALMONIDÆ.

Salmo salar, Linn.—SALMON.—Northern America and Europe.

14898. Cast. Bucksport, Me. Joseph Palmer. July 1, 1873.
16744. Cast. Bucksport, Me. C. G. Atkins. Nov., 1873.
16743. Cast. Bucksport, Me. C. G. Atkins. Nov., 1873.
10314. Cast. Bucksport, Me. C. G. Atkins. July 1, 1873.
239, 240, 241, 242. Photographs. U. S. Fish Commission.
415. Water-color sketch. U. S. Fish Commission.

Salmo salar, *var.* **sebago,** Girard.—SEBAGO SALMON (land-locked.) —St. Croix River and Sebago Lake. Introduced into other lakes.

15467. Cast. Sysladobsis Lake, Me. "Dobsis Club," through Judge Harvey Jewell. June, 1875.
15977. Cast.
15978. Cast.
535–6. Color sketches. (Richard.) U. S. Fish Commission.

Salmo fario, Linn.—RIVER TROUT.—Rivers of Europe.

252. Photograph. U. S. Fish Commission.

Oncorhynchus quinnat, (Rich.) Günther.—QUINNAT or SACRAMENTO SALMON.—Northwest Coast of America; south to California.

10340. Cast. New York market. E. G. Blackford.
10347. Cast. Sacramento River, Cal. L. Stone. March, 1873.
248, 249, 250, 251. Photographs. U. S. Fish Commission.
416. Color sketch. (Richard.) U. S. Fish Commission.

Cristivomer namaycush, (Penn.) Gill & Jordan.—NAMAYCUSH TROUT; LAKE TROUT.—Northern Lakes.

246, 247. Photographs. U. S. Fish Commission.
10312. Cast. Moosehead Lake, Me. E. M. Stillwell.
16670–71. Casts. Lake Winnepiscogee. U. S. Fish Commission.
463, 526–7. Color sketches. (Richard.) U. S. Fish Commission.

Salvelinus fontinalis, (Mitch.) Gill & Jordan.—BROOK TROUT.—Rivers and Lakes of British North America and of the northern parts of the United States and Appalachian Range.

16626. Cast. Wood's Holl, Mass. V. N. Edwards.
15961. Cast. Sysladobsis Lake, Me. "Dobsis Club," through Judge Harvey Jewell. June, 1875.
15728. Cast. New York market. E. G. Blackford. March 22, 1875.
10311. Cast. New York market. E. G. Blackford. March 22, 1875.
15470. Cast. Sysladobsis Lake, Me. "Dobsis Club," through Judge Harvey Jewell. June, 1875.
243, 244. Photographs. U. S. Fish Commission.
751. Color sketch. (Richard.) U. S. Fish Commission.
26792. Mounted. (Male.) Rangely Lake, Me. Geo. Shepard Page. Weight 10 pounds. The largest Brook Trout on record. Taken by Geo. Shepard Page in 1867. Transported alive in a box of water (which also contained a female trout weighing 8¼ pounds) to Stanley, Morris Co., New Jersey.

Salvelinus oquassa, (Girard) Gill & Jordan.—OQUASSA TROUT.—Rangely Lake, Me., and vicinity.

245. Photograph. U. S. Fish Commission.
549. Color sketch. (Richard.) U. S. Fish Commission.
750. Color sketch. (Richard.) U. S. Fish Commission.

Thymallus tricolor, Cope.—MICHIGAN GRAYLING.—Northern portion southern peninsula of Michigan.

15226. Cast. Au Sable River, Mich. Fred. Mather. April 7, 1875.
236, 238. Photographs. U. S. Fish Commission.

ALBULIDÆ.

Albula vulpes, (Linn.) Goode.—LADY-FISH.—Pelagic; Tropical and Subtropical Seas.

255. Photograph. U. S. Fish Commission.
21859. Alcoholic. Wood's Holl, Mass. U. S. Fish Commission.

HYODONTIDÆ.

Hyodon tergisus, Les.—MOON-EYE.—Great Lakes and Mississippi Valley.

15561. Cast. New York market. E. G. Blackford. Nov. 15, 1875.
14863. Cast. Cincinnati, Ohio. J. W. Milner. Nov., 1873.
253, 254. Photographs. U. S. Fish Commission.
753. Color sketch. (Richard.) U. S. Fish Commission.

ELOPIDÆ.

Elops saurus, Linn.—BIG-EYED HERRING.—Tropical and Subtropical Seas.

15824. Cast. New York market. E. G. Blackford. Oct. 11, 1875.
15821. Cast. New York market. E. G. Blackford. Oct. 11, 1875.
15823. Cast. New York market. E. G. Blackford. Oct. 11, 1875.
15822. Cast. New York market. E. G. Blackford. Oct. 14, 1875.
15744. Cast. New York market. E. G. Blackford. Oct. 14, 1875.
15824. Cast. New York market. E. G. Blackford. Oct. 11, 1875.
256. Photograph. U. S. Fish Commission.
772. Color sketch. (Richard.) U. S. Fish Commission.

Megalops thrissoides, (Schn.) Günther.—TARPUM.—Cape Cod to Florida.

14924. Cast. New Jersey. E. G. Blackford. July 9, 1874.
398. Photograph. Newport, R. I. S. Powell. Aug., 1874.

DUSSUMIERIDÆ.

Etrumeus teres, (DeKay) Brevoort.—ROUND HERRING.—Cape Cod to Cape Hatteras.

20216. Alcoholic. Newport, R. I. S. Powel.

CLUPEIDÆ.

Brevoortia tyrannus, (Latr.) Goode.—MENHADEN; MOSSBUNKER; POGIE.—Newfoundland to Gulf of Mexico.

10696. Cast. Wood's Holl, Mass. U. S. Fish Commission.
16313. Cast. Wood's Holl, Mass. U. S. Fish Commission. Aug., 1875.
257, 258, 259, 260, 386, 387. Photographs. U. S. Fish Commission.
564. Color sketch. Prof. Alex. Agassiz.

Brevoortia patronus, Goode.—GULF MENHADEN.—Gulf of Mexico.

892. Alcoholic. Brazos Santiago, Texas.

Alosa sapidissima, (Wilson) Storer.—SHAD.—Newfoundland to Florida.

10641. Cast. Potomac River. J. W. Milner. 1873.
10625. Cast. Potomac River, D. C. J. W. Milner.
14878. Cast. Connecticut River. E. G. Blackford. May 7, 1874.
261, 262, 263, 264, 265. Photographs. U. S. Fish Commission.

Opisthonema thrissa, Gill.—THREAD HERRING.—West Indian Fauna and north to Cape Cod.

20218. Alcoholic. Newport, R. I. U. S. Fish Commission.

Pomolobus pseudoharengus, (Wilson) Gill.—ALEWIFE; FRESH-WATER HERRING; GASPEREAU.—Newfoundland to Florida.

10622. Cast. (Female.) Wood's Holl, Mass. U. S. Fish Commission.
266, 267, 268, 269, 386. Photographs. U. S. Fish Commission.
457. Color sketch. (Richard.) U. S. Fish Commission.

Pomolobus mediocris, (Mitch.) Gill.—MATTAWOCCA; TAILOR HERRING; SEA SHAD.—Newfoundland to Florida.

10657. Cast. Potomac River. J. W. Milner. 1873.
269, 270, 271. Photographs. U. S. Fish Commission.
458, 771. Color sketches. (Richard.) U. S. Fish Commission.

Clupea harengus, Linn.—HERRING; SEA HERRING.—North Atlantic.

399. Photograph. U. S. Fish Commission.
13855. Alcoholic. Eastport, Me. U. S. Fish Commission.

Clupea mirabilis, Girard.—HERRING.—Coast of California.

605. Color sketch. Galiano Id., Gulf of Georgia, W. T. Prof. Alex. Agassiz. June, 1859.

DOROSOMIDÆ.

Dorysoma Cepedianum, (Lac.) Gill.—MUD SHAD; WINTER SHAD.—Cape Cod to St. John's River, Fla.

14991. Cast. Potomac River. G. Brown Goode. March 1, 1875.
15695. Cast. Washington market. G. Brown Goode. Dec., 1874.
272, 273. Photographs. U. S. Fish Commission.
798. Color sketch. (Richard.) U. S. Fish Commission.

Dorysoma Cepedianum, *var.* **heterurum,** (Raf.) Jordan.—OHIO GIZZARD SHAD.—Ohio River and Lower Mississippi.

20836. Alcoholic. Sarnia, Lake Huron. S. Wilmot.

ENGRAULIDIDÆ.

Engraulis vittata, (Mitch.) B. & G.—ANCHOVY.—Cape Cod to Cape Hatteras.

382. Photograph. U. S. Fish Commission.
14086. Alcoholic. Watch Hill, R. I., &c. U. S. Fish Commission.

EVENTOGNATHI.

CATOSTOMIDÆ.

Catostomus teres, (Mitchill) Les.—COMMON SUCKER.—Eastern Northern America.

279. Photograph. U. S. Fish Commission.
18258. Alcoholic. Potomac River. U. S. Fish Commission.

Myxostoma macrolepidotum, (Les.) Jordan.—STRIPED SUCKER.—Mississippi Valley and Great Lakes.

15930. Cast. Washington market. J. W. Milner.
16786. Cast. Washington market. J. W. Milner.
16785. Cast. Washington market. J. W. Milner.
278. Photograph. U. S. Fish Commission.

Cycleptus elongatus, (Les.) Ag.—BLACK SUCKER.—Mississippi Valley.

16781. Cast. Ohio River. J. W. Milner. Nov. 5, 1875.
280. Photograph. U. S. Fish Commission.

Erimyzon sucetta, (Lac.) Jordan.—CHUB SUCKER.—Eastern United States.

281. Photograph. U. S. Fish Commission.

Erimyzon Goodei, Jordan.—GOODE'S SUCKER.—Florida.

19071. Alcoholic. St. John's River, Fla. G. Brown Goode.

Bubalichthys bubalus, Ag.—BUFFALO-FISH.—Mississippi Valley.

14883. Cast. Cincinnati, Ohio. J. W. Milner. Nov. 5, 1873.

Carpiodes cyprinus, (Les.) Ag.—CARP.—Eastern United States.

10735. Cast. Potomac River, D. C. J. W. Milner.
16780. Cast. Sandusky, Ohio. J. W. Milner. Nov. 3, 1875.

CYPRINIDÆ.

Ptychocheilus grandis, (Ayres) Girard.—"PIKE."—Pacific Slope.

282. Photograph. U. S. Fish Commission.

Notemigonus americanus, (Linn.) Jordan.—SHINER.—Southern Rivers.

19063. Alcoholic. St. John's River, Fla. G. Brown Goode.

Notemigonus chrysoleucus, (Mitch.) Jordan.—SHINER.—Eastern Atlantic States.

435. Color sketch. (Richard.) U. S. Fish Commission.

Leuciscus pulchellus, Storer.

630. Color sketch. (Burkhardt.) New Bedford, Mass. Prof. Alex. Agassiz. 1861.

Carassius auratus, (Linn.) Bleeker.—GOLD-FISH.—Domesticated; native of China and Japan.

16667. Cast. Washington, D. C. J. H. Richard.
18290. Alcoholic. Ponds of Maryland. U. S. Fish Commission.

ORDER NEMATOGNATHI.

SILURIDÆ.

Ælurichthys marinus, (Mitch.) B. & G.—FORK-TAILED CAT-FISH.—Cape Cod to Florida; Gulf of Mexico.

15575. Cast. New Bedford, Mass. U. S. Fish Commission. Oct. 11, 1875.
283, 284, 285. Photographs. U. S. Fish Commission.
522. Color sketch. (Richard.) U. S. Fish Commission.

Amiurus catus, (Linn.) Gill.—HORN POUT.—Eastern North America.

466. Color sketch. Prof. Alex. Agassiz. Natural size drawing by P. Roetter from a fresh specimen, East Wareham, Mass., Feb., 1869; weight, 1¼ lbs. "S. T. Tisdale says he has seen the young of this species following the mother like a brood of chickens."—*Ms. note.*

Ichthælurus furcatus, (C. & V.) Gill.—CHANNEL CAT-FISH.—Mississippi Valley.

15690. Cast. Carrollton, Ky. J. W. Milner.
15787. Cast. Carrollton, Ky. J. W. Milner. Nov. 5, 1873.

Pelodichthys olivaris, (Raf.) Gill & Jordan.—MUD CAT-FISH.—Ohio Valley to Iowa and south.

15689. Cast. Carrollton, Ky. J. W. Milner. Nov. 5, 1875.

ORDER APODES.

CONGRIDÆ.

Conger oceanica, (Mitch.) Gill.—CONGER EEL.—Newfoundland to West Indies.

14873. Cast. Weight 11 lbs. Block Id., R. I. U. S. Fish Commission. Sept. 26, 1874.
14872. Cast. Block Island, R. I. U. S. Fish Commission. Sept. 26, 1874.
287. Photograph. U. S. Fish Commission.

ANGUILLIDÆ.

Anguilla rostrata, (Les.) DeKay.—COMMON EEL.—Eastern United States.

15731. Cast. New York. E. G. Blackford. Aug. 26, 1874.
16392. Cast. New York. E. G. Blackford. Aug. 26, 1874.
16729. Cast. Potomac River. J. W. Milner.
16416. Cast. Wood's Holl, Mass. Wm. Palmer. Sept. 6, 1875.
10749. Cast. Wood's Holl, Mass. V. N. Edwards.
286. Photograph. U. S. Fish Commission.
480–81. Color sketches. (Richard.) U. S. Fish Commission.
773. Color sketch. Prof. Alex. Agassiz.

NEMICHTHYIDÆ.

Nemichthys scolopaceus? Rich.—SNIPE EEL.—Deep waters of the Atlantic.

21195. Alcoholic. George's Bank. U. S. Fish Commission.

SYNAPHOBRANCHIDÆ.

Synaphobranchus pinnatus, (Gronow) Günther.—MADEIRA EEL.—Deep waters of the Atlantic.

21848. Alcoholic. Sable Island Bank. U. S. Fish Commission.

ORDER CYCLOGANOIDEI.

AMIIDÆ.

Amia calva, Linn.—MUD-FISH.—Central and Southeastern United States.

11134. Cast. Sandusky, Ohio. J. W. Milner.
16534. Cast. New York market. E. G. Blackford. Sept. 24, 1875.
288,289. Photograph. U. S. Fish Commission.
556. Color sketch. (Burkhardt.) Charleston, S. C. Prof. Alex. Agassiz. 1853.

ORDER RHOMBOGANOIDEI.

LEPIDOSTEIDÆ.

Lepidosteus osseus, Linn.—GAR PIKE.—Mississippi Valley and Atlantic States south of Delaware River.

10736. Cast. Sandusky, Ohio. J. W. Milner.
10717. Cast. Sandusky, Ohio. J. W. Milner.
15366. Cast. Potomac River. J. W. Milner.
290, 291. Photographs. U. S. Fish Commission.

Lepidosteus platystomus, Raf.—SHORT-NOSED GAR PIKE.—Great Lakes and streams south and west to the Rocky Mountains.

3241. Alcoholic. Cleveland, Ohio. Prof. Baird.

ORDER SELACHOSTOMI.

POLYODONTIDÆ.

Polyodon folium, Lac.—PADDLE-FISH.—Fresh waters of Mississippi Valley.

14871. Cast. Cincinnati, Ohio. J. W. Milner. Nov. 5, 1873.
15475. Cast. Madison, Ind. George Spangler. June, 1875.
292. Photograph. U. S. Fish Commission.

ORDER CHONDROSTEI.

ACIPENSERIDÆ.

Acipenser sturio, Linn.—SHARP-NOSED STURGEON.—North Atlantic; ascending rivers.

15745. Cast. New York. E. G. Blackford.
14866. Cast. Wood's Holl, Mass. U. S. Fish Commission.
14877. Potomac River. J. W. Milner.
293, 294. Photographs. U. S. Fish Commission.
519. Color sketch. (Richard.) U. S. Fish Commission.

Acipenser brevirostris, Les.—SHORT-NOSED STURGEON.—Atlantic Coast of United States.

295, 296. Photographs. U. S. Fish Commission.
520. Color sketch. (Richard.) U. S. Fish Commission.

Acipenser rubicundus, Les.—LAKE STURGEON.—Great Lakes and south.

297, 298, 299, 300, and 301. Photographs. U. S. Fish Commission.

Acipenser maculosus, Les.—LONG-NOSED STURGEON.—Great Lakes and Western Rivers.

607–8. Color sketch. Huntsville, Ala. Prof. Alex. Agassiz. 1853.

Scaphyrhynchops platyrhynchus, (Raf.) Gill.—SHOVEL-NOSED STURGEON.—Mississippi Valley.

15939¼. Cast. Ohio River. J. W. Milner.
15939. Cast. Ohio River. J. W. Milner.
15476. Cast. Madison, Ind. George Spangler. June, 1875.
302, 303. Photographs. U. S. Fish Commission.

VI. ELASMOBRANCHIATES.

ORDER HOLOCEPHALI.

CHIMÆRIDÆ.

Chimæra plumbea, Gill.—BROWN CHIMÆRA.—Deep waters of Western Atlantic.

21904. Cast. Banquereau. Capt. Joseph W. Collins.

Hydrolagus Colliei, (Bennett) Gill.—PACIFIC CHIMÆRA.—Northwest coast of North America.

993. Alcoholic. Puget Sound. Dr. George Suckley.

ORDER RAIÆ.

MYLIOBATIDÆ.

Myliobatis Fremenvillei, (Les.) Storer.—EAGLE RAY.—Cape Cod to Florida.

16603. Cast. Wood's Holl, Mass. U. S. Fish Commission. Sept. 23, 1875.
14417. Cast. Wood's Holl, Mass. U. S. Fish Commission.
306–319. Photographs. U. S. Fish Commission.
760. Color sketch. U. S. Fish Commission.

Myliobatis californicus, Gill.—CALIFORNIA STING RAY.—Coast of California.

16687. Cast. San Francisco, Cal. L. Stone.
320. Photograph. U. S. Fish Commission.
959. Color sketch. U. S. Fish Commission.

Rhinoptera quadriloba, (Les.) Cuv.—COW-NOSED RAY.—Cape Cod to Florida.

304, 305. Photographs. U. S. Fish Commission.

TRYGONIDÆ.

Trygon centrura, (Mitch.) Gill.—STING RAY.—Cape Cod to Florida.

14920. Cast. Wood's Holl, Mass. U. S. Fish Commission. June, 1873.
14882. Cast. Portland, Me. Skillings.
324, 325, 326, 327, 328, 329. Photographs. U. S. Fish Commission.

Trygon Sabina, Lesueur.—RIVER STING RAY.—Southern Coast entering rivers.

18068. Alcoholic. Lake Monroe, Fla. Prof. Baird.

Trygon hastata, (De Kay) Storer.—SMOOTH STING RAY.—Southern Coast.

21626. Skin. West Florida. Dr. J. W. Velie.

Pteroplatea maclura, Mull. & Henle.—BUTTERFLY RAY.—Cape Cod to Florida.

16319. Cast. Wood's Holl, Mass. U. S. Fish Commission. Aug. 5, 1875.
321, 322, 323. Photographs. U. S. Fish Commission.

TORPEDINIDÆ.

Torpedo occidentalis, Storer.—TORPEDO; CRAMP-FISH.—Cape Cod to Florida.

14912. Cast. Wood's Holl, Mass. U. S. Fish Commission. July 22, 1873.
14919. Cast. Wood's Holl, Mass. U. S. Fish Commission. July 5, 1873.
16665. Cast. Wood's Holl, Mass. U. S. Fish Commission. July 5, 1873.
330, 331, 332, 333, 334, 335. Photographs. U. S. Fish Commission.

RAIIDÆ.

Raia erinacea, Mitchill.—CLEAR-NOSED SKATE.—Nova Scotia to Florida.

343, 344, 345, 346. Photographs. U. S. Fish Commission.
14881. Cast. Portland, Me. U. S. Fish Commission.
10612. Cast. Wood's Holl, Mass. V. N. Edwards.
16508. Cast. Wood's Holl, Mass. V. N. Edwards. May 14, 1873.
336, 337, 338, 339, 340, 341, 342. Photographs. U. S. Fish Commission.
408, 409. Color sketches. (Richard.) U. S. Fish Commission.
761–2–3. Color sketches. U. S. Fish Commission.
768–9. Color sketches. U. S. Fish Commission.
774–5. Color sketches. Prof. Alex. Agassiz.

Raia ocellata, Mitchill.—SPOTTED SKATE.—New England Coast.

19434. Alcoholic. Nahant, Mass. Mus. of Comp. Zoology.

Raia radiata, Donovan.—SPINY SKATE.—Northern Atlantic.

19432. Alcoholic. Nahant, Mass. Mus. of Comp. Zoology.

Raia eglanteria, Lacep.—EGLANTINE SKATE.—Cape Ann and southward.

19439. Alcoholic. S. New England. Mus. of Comp. Zoology.

Raia lævis, Mitch.—SHARP-NOSED SKATE.—Nova Scotia to Florida.

14904. Cast. (Young male.) Montauk Point, N. Y. U. S. Fish Commission. Aug. 1, 1874.
402. Color sketch. U. S. Fish Commission.
15704. Cast. (Young.) Noank, Conn. U. S. Fish Commission. Aug. 1, 1874.
15703. Cast. Noank, Conn. U. S. Fish Commission.
16658. Cast. (Young male.)
15707. Cast.
16659. Cast.
347, 348, 349, 350, 351. Photographs. U. S. Fish Commission.

RHINOBATIDÆ.

Rhinobatus productus, Girard.—LONG-NOSED SKATE.—Coast of California.

16704. Cast. San Francisco, Cal. L. Stone.
352. Photograph. U. S. Fish Commission.

PRISTIDÆ.

Pristis antiquorum, (Linn.) Lath.—SAW-FISH.—Cape Cod to Florida; Tropical Seas.

12453. Stuffed skin. Florida. H. A. Ward.

SQUATINIDÆ.

Squatina Dumerili, Les.—MONK-FISH; FIDDLE-FISH.—Cape Cod to Florida; Temperate and Tropical Seas.

14890. Cast. Wood's Holl, Mass. V. N. Edwards. Sept. 1, 1873.
16410. Cast. Menemsha Bight, Mass. Jason Luce. Sept. 1, 1875.
353, 354, 355. Photographs. U. S. Fish Commission.

ORDER SQUALI.

LAMNIDÆ.

Lamna cornubica, (Gmel.) Fleming.—PORBEAGLE SHARK.—Atlantic, Mediterranean, Japan.

21856. Alcoholic. Gloucester, Mass. U. S. Fish Commission.

Isuropsis Dekayi, Gill. (d. s.)—MACKEREL SHARK.—Newfoundland to Florida.

15949. Cast. Wood's Holl, Mass. V. N. Edwards. Sept. 20, 1873.
15973. Cast. Wood's Holl, Mass. V. N. Edwards. Dec., 1875.
446. Color sketch. (Richard.) U. S. Fish Commission.

Carcharodon Atwoodi, (Storer) Gill.—ATWOOD'S SHARK; MAN-EATER.—Newfoundland to Florida.

——. Jaws.

Cynocephalus glaucus, (Linn.) Gill.—BLUE-HEADED SHARK.—Atlantic.

19929. Alcoholic. Wood's Holl, Mass. V. N. Edwards.

ODONTASPIDIDÆ.

Eugomphodus littoralis, Gill.—SAND SHARK.—Pelagic.

16647. Cast. Wood's Holl, Mass. U. S. Fish Commission.
16648. Cast. Wood's Holl, Mass. U. S. Fish Commission.
419. Color sketch. (Richard.) U. S. Fish Commission.
445. Color sketch. (Richard.) U. S. Fish Commission.

ALOPECIDÆ.

Alopias vulpes, (Linn.) Bon.—THRESHER; SWINGLE-TAIL.—Atlantic and Mediterranean.

16256. Cast. Menemsha Bight, Mass. U. S. Fish Commission. July 30, 1875.
15733. Cast. Wood's Holl, Mass. U. S. Fish Commission.
417. Color sketch. (Richard.) U. S. Fish Commission.

SPHYRNIDÆ.

Sphyrna zygæna, (Linn.) Mull. & Henle.—HAMMER-HEAD SHARK.—Tropical and Subtropical Seas.

15833. Cast. Noank, Conn. U. S. Fish Commission.
360, 361, 362, 363, 364. Photographs. U. S. Fish Commission.
462. Color sketch. (Richard.) U. S. Fish Commission.

Reniceps tiburo, (Linn.) Gill.—SHOVEL-HEAD SHARK.—Atlantic and Western Pacific.

12714. Cast.
——. Alcoholic. Beesley's Point, N. J. S. F. Baird.

GALEORHINIDÆ.

Eulamia Milberti, (Mull. & Henle) Gill.—BLUE SHARK.—Cape Cod to Florida.

15742. Cast. Wood's Holl, Mass. V. N. Edwards.
366, 337, 368, 369. Photographs. U. S. Fish Commission.
418. Color sketch. (Richard.) U. S. Fish Commission.

Eulamia obscurus, (Les.) Gill.—DUSKY SHARK.—Cape Cod to Florida.

16070. Cast. Wood's Holl, Mass. U. S. Fish Commission. July 10, 1875.

Isogomphodon maculipinnis, Poey.—SPOTTED-FIN SHARK.—Tropical and Subtropical Seas.

356, 357, 358, 359. Photographs. U. S. Fish Commission.
425. Color sketch. (Richard.) U. S. Fish Commission.
16401. Cast. Wood's Holl, Mass. U. S. Fish Commission.

Galeocerdo tigrinus, Mull. & Henle.—TIGER SHARK.—Atlantic; Indian Ocean.

15740. Cast. Wood's Holl, Mass. V. N. Edwards. July 22, 1873.
16069. Cast. Buzzard's Bay, Mass. U. S. Fish Commission. 1875.
370, 371. Photographs. U. S. Fish Commission.

Mustelus canis, (Mitch.) De Kay.—SMOOTH DOG-FISH.—Cape Cod to Cape Hatteras.

14908. Cast. Norfolk, Va. U. S. Fish Commission. June 25, 1873.
14925. Cast. Wood's Holl, Mass. U. S. Fish Commission.
10734. Cast. Wood's Holl, Mass. U. S. Fish Commission.
10733. Cast. Wood's Holl, Mass. U. S. Fish Commission.
16649. Cast. (Male.) Wood's Holl, Mass. U. S. Fish Commission.
372, 373, 374, 375. Photographs. U. S. Fish Commission.
——. Color sketches. (Richard.) U. S. Fish Commission.

GINGLYMOSTOMATIDÆ.

Ginglymostoma cirratum, (Gmel.) M. & H.—NURSE SHARK.—Tropical Atlantic.

16909. Alcoholic. Chesapeake Bay. Maryland Academy of Science.

SPINACIDÆ.

Squalus americanus, (Storer) Gill.—SPINED DOG-FISH.—Newfoundland to Cape Hatteras.

16255. Cast. Martha's Vineyard. U. S. Fish Commission. July 30, 1875.
376, 377. Photographs. U. S. Fish Commission.
426. Color sketch. (Richard.) U. S. Fish Commission.

Centroscyllium Fabricii, (Reinh.) M. & H.—GREENLAND DOG-FISH.—Deep waters of Western Atlantic.

21622. Cast. Lat. 42° 52′ N., Lon. 63° 50′ W. 220 to 260 fathoms. U. S. Fish Commission.

SCYMNIDÆ.

Somniosus microcephalus, (Bloch.) Gill.—SLEEPER SHARK.—North Atlantic.

378, 379. Photographs. U. S. Fish Commission.
447. Color sketch. (Richard.) U. S. Fish Commission.
16630. Cast. Gulf of St. Lawrence. Renfrew & Co. Nov. 20, 1875.

Centroscymnus cœlolepis, Bocage & Capello.—BLACK DOG-FISH.—Deep waters of North Atlantic.

21621. Cast. Lat. 42° 40′ N., Lon 63° 50′ W. 220 to 260 fathoms. U. S. Fish Commission.

ECHINORHINIDÆ.

Echinorhinus spinosus, (Gmel.) Delamoille.—SPINY SHARK.—North Atlantic.

21913. Cast. Provincetown, Mass. E. E. Small.

VII. MARSIPOBRANCHIATES.

ORDER HYPEROARTIA.

PETROMYZONTIDÆ.

Petromyzon americanus.—LAMPREY EEL.

489–90. Color sketches. Prof. Alex. Agassiz.

ORDER HYPEROTRETI.

MYXINIDÆ.

Myxine glutinosa, Linn.—HAG-FISH; SLIME-FISH.—North Atlantic.

21679. Alcoholic. Le Have Bank, N. B. U. S. Fish Commission.

VIII. LEPTOCARDIANS.

ORDER CIRROSTOMI.

BRANCHIOSTOMIDÆ.

Branchiostoma lubricum, Costa.—LANCELET.—Cosmopolitan.

21877. Alcoholic. Bermudas. G. Brown Goode.

SECTION B.

(THE CHASE AND THE FISHERIES.)

MEANS OF PURSUIT AND CAPTURE.

I. HAND IMPLEMENTS OR TOOLS.

* *For striking.*

1. CLUBS.

Unarmed clubs.[1]

Salmon-clubs used by the Indians of the Northwest coast.

Hunting-clubs.[1]

Fishermen's clubs.

32717. "Halibut killer and gob-stick." Philip Merchant, Gloucester, Mass. A heavy club with which the fisherman kills the halibut by a blow upon the head. One end is sharpened for use in detaching hooks from the gullets of fish which have swallowed them.

Armed clubs.[1]

Stone-headed clubs.[1]

Clubs, armed with teeth or bone points.[1]

Clubs, armed with metal points.[1]

2. SLUNG-WEIGHTS.

Slung-stones.[1]

Slung-shot.[1]

** *For cutting.*

3. KNIVES.

Straight knives.

Hunters' knives.

26152.	Hunter's knife.	5½-inch blade.	John Russell Cutlery Co., Turner's [Falls, Mass.
26153.	Hunter's knife.	6-inch blade.	"
26154.	Hunter's knife.	7-inch blade.	"
26155.	Hunter's knife.	8-inch blade.	"
26172.	Hunter's knife.	5½-inch blade.	"
26173.	Hunter's knife.	6-inch blade.	"
26174.	Hunter's knife.	6½-inch blade.	"
26175.	Hunter's knife.	8-inch blade.	"
26191.	Hunter's knife.	5-inch blade.	"
26192.	Hunter's knife.	6-inch blade.	"
26193.	Hunter's knife.	7-inch blade.	"
26194.	Hunter's knife.	8-inch blade.	"

[1] Displayed in the Ethnological division.

Straight knives.

Hunters' knives.

26220.	Hunter's knife.	5-inch blade.	John Russell Cutlery Co., Turner's Falls, Mass.
26221.	Hunter's knife.	6-inch blade.	"
26222.	Hunter's knife.	7-inch blade.	"
26223.	Hunter's knife.	8-inch blade.	"
26224.	Hunter's knife.	10-inch blade.	"
26145.	Hunter's knife.	5½-inch blade.	"
26146.	Hunter's knife.	6-inch blade.	"
26147.	Hunter's knife.	7-inch blade.	"
26148.	Hunter's knife.	8-inch blade.	"
26160.	Hunter's knife.	5-inch blade.	"
26161.	Hunter's knife.	6-inch blade.	"
26162.	Hunter's knife.	7-inch blade.	"
26163.	Hunter's knife.	8-inch blade.	"
26164.	Hunter's knife.	9-inch blade.	"
26165.	Hunter's knife.	10-inch blade.	"
26166.	Hunter's knife.	11-inch blade.	"
26167.	Hunter's knife.	12-inch blade.	"
26156.	Hunter's knife.	5-inch blade.	"
26157.	Hunter's knife.	5½-inch blade.	"
26158.	Hunter's knife.	7-inch blade.	"
26202.	Hunter's knife.	5-inch blade.	"
26203.	Hunter's knife.	6-inch blade.	"
26204.	Hunter's knife.	7-inch blade.	"
26205.	Hunter's knife.	8-inch blade.	"
26206.	Hunter's knife.	9-inch blade.	"
26207.	Hunter's knife.	10-inch blade.	"
26208.	Hunter's knife.	12-inch blade.	"

Dudley hunters' knives.

26197.	Hunter's knife.	5-inch blade.	"
26198.	Hunter's knife.	6-inch blade.	"
26199.	Hunter's knife.	7-inch blade.	"
26200.	Hunter's knife.	9-inch blade.	"

Hunters' dirk-knives.

26225.	Hunter's knife (metal guard).	5-inch blade.	"
26226.	Hunter's knife (metal guard).	6-inch blade.	"
26227.	Hunter's knife (metal guard).	7-inch blade.	"
26228.	Hunter's knife (metal guard).	8-inch blade.	"
26143.	Hunter's knife (metal guard).	7-inch blade.	"
26168.	Hunter's knife (solid guard).	7-inch blade.	"

Splitting and ripping knives.

29401. Double-edged throating and ripping knife. A. McCurdy, Gloucester, Mass.

29403. Double-edged throating-knife (old style). G. B. Foster, Beverly, Mass.

29409. Throating or ripping knife. A. McCurdy, Gloucester, Mass.

29411. Throating or ripping knife. Capt. E. L. Rowe, Gloucester, Mass.

Straight knives.

Splitting and ripping knives.

29416. Double-edged ripping-knife (peculiar to coast of Maine). Wilcox, Crittenden & Co., Middletown, Conn.
29402. Mackerel-splitting knife. A. McCurdy, Gloucester, Mass.
29408. Mackerel-splitting knife. Capt. Sam. Elwell, Gloucester, Mass.
29404. Codfish-splitting knife. A. McCurdy, Gloucester, Mass.
29413. Cod or haddock ripping knife (old style). G. P. Foster, Beverly, Mass.
29414. Hake or haddock splitting knife. A. McCurdy, Gloucester, Mass.
29415. Haddock-ripping knife. " "

Flaying-knives, aboriginal and recent.[1]

26169.	Flaying-knife.	5-inch blade.	John Russell Cutlery Co.,	Turner's Falls, Mass.
26170.	Flaying-knife.	6-inch blade.	"	"
26171.	Flaying-knife.	7-inch blade.	"	"
26179.	Flaying-knife.	5-inch blade.	"	"
26180.	Flaying-knife.	6-inch blade.	"	"
26181.	Flaying-knife.	6½-inch blade.	"	"
26185.	Flaying-knife.	5-inch blade.	"	"
26186.	Flaying-knife.	6-inch blade.	"	"
26187.	Flaying-knife.	7-inch blade.	"	"
26188.	Flaying-knife.	5-inch blade.	"	"
26189.	Flaying-knife.	6-inch blade.	"	"
26190.	Flaying-knife.	7-inch blade.	"	"
26211.	Flaying-knife.	5-inch blade.	"	"
26212.	Flaying-knife.	6-inch blade.	"	"
26213.	Flaying-knife.	6½-inch blade.	"	"

Blubber-knives, Eskimos.[2]

Boarding-knives used by whalemen.

Used in cutting the blubber into sections from the "blanket piece" or long strip which is peeled from the sides of the whale; for illustration of the manner of use see the model of whaler "cutting in the blubber."

25676. Boarding-knife. W. H. Cook & Co., New Bedford, Mass.
"This knife has seen many years of service."—A. R. C.
26608. Boarding-knife, with sheath. A. R. Crittenden, Middletown, Conn.

Whalemen's boat-knives.

Used to cut the harpoon-line when it gets tangled in paying out.

——. Boat-knife (model). Capt. L. Howland, New Bedford.
This model in its sheath on the bulkhead of the whale-boat, ready for use, is shown in the model of a whale-boat (No. 24880).

Heading-knives.

32689. Halibut-heading knife. Adolph Voss, Gloucester, Mass.

[1] A full series of Eskimo and Indian flaying-knives is displayed in the Ethnological division.

[2] A series of these implements is exhibited in the Ethnological division.

Straight knives.

Finning-knives.

29400. Halibut-finning knife. Alex. McCurdy, Gloucester, Mass.
29412. Halibut-finning knife. Capt. E. L. Rowe, Gloucester, Mass.

Chopping-knives.

29406. Bait-cleaver (used in halibut fishing). Alex. McCurdy, Gloucester, Mass.
32665. Cod-bait knife. Gloucester, Mass. U. S. Fish Commission.
32664. Bait-cleaver. " "

Cheek-knives.

29438. Codfish cheek-knife. Alex. McCurdy, Gloucester, Mass.

Throating-knives.

22669. Cod-throater (single edge). Gloucester, Mass. U. S. Fish Commission.
22670. Cod-throater (double edge). " "

Fish-knives (for general use).

26159. Fish-knife. Heavy. 12-inch blade. John Russell Cutlery Co., Turner's Falls, Mass.
26196. Fish-knife. Hook handle. 12-inch blade. John Russell Cutlery Co., Turner's Falls, Mass.

Scaling-knives.

26210. Saw-blade fish-scaling knife. John Russell Cutlery Co., Turner's Falls, Mass.

Sailors' and fishermen's sheath-knives.

Sailors' sheath-knives. Wilcox, Crittenden & Co., Middletown, Conn.

29428. Sheath and belt, with "law-abiding" sheath-knife. First quality.
29426. Sheath and belt. Second quality.
29427. Sheath and belt, with "law-abiding" sheath-knife. Third quality. The "law-abiding" sheath-knife is round at the tip of the blade, which is also thick and dull.

Hunters' sheath-knives.

The hunting-knives enumerated above, manufactured by the John Russell Cutlery Co., and others like them, are usually provided with sheaths before they are used by hunters.

26665. Hunting-knife, sheath, and belt. Forest & Stream Publishing Co. (Property of John A. Nichols, Syracuse, N. Y.)

Slivering-knives, used by fishermen.

These knives are used to slice the flesh from the sides of the menhaden used for bait. The slices thus prepared are called "slivers," and are salted down in barrels to be used as baits for cod, halibut, and mackerel hooks, or are ground up in the bait-mills, forming "stosh" or "chum," a thick paste which is thrown over the sides of the mackerel-smacks to tole the fish to the surface.

Straight knives.

Slivering-knives, used by fishermen.

29407. Slivering-knife. (Pattern first used by Cape Ann fishermen.) Geo. B. Foster, Beverly, Mass.
29399. Slivering-knife. (Cape Ann pattern.) Alex. McCurdy.
29405. Slivering-knife. (Nantucket pattern.) Samuel Elwell, jr., Gloucester, Mass.
25764. Slivering-knife. Samuel Elwell, jr., Gloucester, Mass.
32666. Slivering-blade. Gloucester, Mass. U. S. Fish Commission.

Flitching-knives.

Used in slicing halibut into steaks or "flitches" in preparation for salting and smoking.

32726. Shore flitching-knife. Gloucester, Mass. U. S. Fish Commission.
32690. Bank flitching-knife. Adolph Voss, Gloucester, Mass.
29410. Flitching-knife. Gloucester, Mass. A. R. Crittenden.

Clam and oyster knives.

26209. Clam-knife. John Russell Cutlery Co., Turner's Falls, Mass.
——. Oyster-knife (model). See model of Chesapeake oyster-canoe (No. 25003).

Net-makers' knives.

These knives are without handles, and the heel of the short (2 inches long) round-pointed blade is curled so as to fit the finger like a ring.

29439. Net-mending knives (right-hand). Alex. McCurdy, Gloucester, Mass.
29440. Net-mending knives (left-hand). Alex. McCurdy, Gloucester, Mass.

Mackerel-rimmers' fatting-knives or ploughs.

Used in creasing the sides of lean mackerel (Nos. 2 and 3) to cause them to resemble fat (No. 1) mackerel.

25768. Mackerel-plough. Edwin Blatchford.
25769. Mackerel-plough. S. Elwell, jr., Gloucester, Mass.
25770. Mackerel-plough. S. Elwell, jr., Gloucester, Mass.
25771. Mackerel-plough. S. Elwell, jr., Gloucester, Mass.
25773. Mackerel-plough. Edward Davis.
25774. Mackerel-plough. Edward Davis.
25775. Mackerel-plough. (Used in 1860.) Mrs. Hannah M. Burt.
25720. Mackerel-plough. Central Wharf Co., Provincetown, Mass.

Splitting-knives.

Used in cleaning fish before salting.

32673. Mackerel-splitting knife. Gloucester, Mass. U. S. Fish Commission.
22667. Cod-splitting knife (curved). " "
22668. Cod-splitting knife (straight). " "

Stone and bone knives used by Indians and Eskimos.

7224. Bone knife. Anderson River Eskimos, Fort Anderson, H. B. T. R. McFarlane.

Straight knives.

Stone and bone knives used by Indians and Eskimos.

16115. Bone knife. Magemut Eskimos, Nunivak Islands, Alaska. W. H. Dall.
2178. Bone knife. Eskimos.
1328. Bone knife. Eskimos.

Harpoon-knives.

16348. Harpoon-knife, with sheath. Magemut Eskimos, Nunivak Islands, [Alaska. W. H. Dall.
16110. Harpoon-knife, with sheath. " "
16105. Harpoon-knife, with sheath. " "
16106. Harpoon-knife, with sheath. " "
19382. Harpoon-knife, with slate blade. " "

Honey-knives.

The thin blade bent at an angle to the handle.

26145. Honey-knife. John Russell Cutlery Co., Turner's Falls, Mass.

Skin scrapers and parers, used in preparing leather.

26144. Tanner's knife. 12-inch blade. John Russell Cutlery Co., Turner's [Falls, Mass.
26195. Tanner's knife. 14-inch blade. " "

4. AXES.

Axes, proper.

Head-axes for whalemen.

Used in cutting off head of whale.

25913. Head-axe. E. B. & F. Macy, New Bedford, Mass.

Whalemen's boat-hatchets.

Used for cutting harpoon-line at the bow, when it becomes tangled in "paying out."

24880. Boat-hatchet. (Model.) Capt. L. Howland, New Bedford, Mass. This implement in its place in the boat is shown in model of whale-boat.
26839. A boat-hatchet may be seen in its proper place in the bow of the large whale-boat.

Cutting-spades.

Whale-spades.

Cutting-spades.

Used in peeling the blubber from the carcass of the dead whale; for illustration see model of "whale-ship cutting in the blubber."

25679. Cutting-spade. E. B. & F. Macy, New Bedford, Mass.
25008. Cutting-spade. J. H. Thomson, New Bedford, Mass.

Cutting-spades.

Throat-spades, flat and round shank.

Used in cutting off the head of the whale.

25925. Throat-spade. E. B. & F. Macy, New Bedford, Mass.

Wide spades.

Used in "blubber-room" for cutting blubber before mincing.

25629. Wide spade. E. B. & F. Macy, New Bedford, Mass.

Half-round spades.

For cutting "blanket" piece, to allow blubber-hook to enter.

25927. Half-round spade. E. B. & F. Macy, New Bedford, Mass.

Head-spades.

Used in cutting off the head of the whale.

25932. Head-spade. E. B. & F. Macy, New Bedford, Mass.

Blubber-mincing spades.

For mincing blubber before trying out.

25912. Hand mince-knife. E. B. & F. Macy, New Bedford, Mass.

Chopping-knives.

Used to chop clams for bait.

29489. Clam-chopper. William H. Hesbolt, Provincetown, Mass.
32676. Clam-chopper. Adolph Voss, Gloucester, Mass.

Bait-mill knives.

Used on the rollers of bait-mincing machines; for mills see section C. 5.

29417. Bait-mill knife. Provincetown pattern. William H. Hesbolt, Provincetown, Mass.
25715. Bait-mill knife. M. W. Grant, Wellfleet, Mass.

Ice-choppers.

Used in chopping ice for packing fish or bait.

32685. Ice-chopper. Adolph Voss, Gloucester, Mass.

Ice-chisels.

Used in cutting holes in the ice for fishing.

25888. Ice-chisel (nickel-plated). Bradford & Anthony, Boston, Mass.

5. THRUSTING SPEARS AND PRODS.

Fishing-lances.

Whale-lances.

Used by whalers to give the death-blow to the whale.

25678. Whale-lance with handle, ready for use. E. B. & F. Macy, New Bedford, Mass.
25007. Whale-lance with handle, ready for use. J. H. Thomson, New Bedford, Mass.

Whale-lance, iron.

25611. Whale-lance. (Primitive model) used by New Bedford whalers. W. H. Cook & Co., New Bedford, Mass.

Seal-lances.

10140. Head of lance (bone and iron). Eskimos of Northeast coast, southwest of King William's Land. Capt. C. F. Hall.
1117. Seal-lance. Eskimos of Arctic coast, Anderson River, H. B. T. R. McFarlane.

Fish-lances.

29453. Sword-fish lance. Saml. Elwell, jr., Gloucester, Mass.
32703. Sword-fish lance. Vinald McCalcb. Gloucester, Mass.
25232. Sword-fish lance (with screw to fix folding handles). U. S. Fish Commission.
26519. Lance. Indians of the Northwest coast. J. G. Swan.
The tip of this lance is made from the horn of the mountain-goat (*Mazama montana*).

Whaleman's boat-spades (thick and thin).

Carried in boat to disable the whale by cutting its flukes.

25928. Boat-spade, with handle and warp complete, ready for use. E. B. & F. Macy, New Bedford, Mass.

Prodding instruments.

Snow-probes.

Used by the Eskimos in probing the air-holes in ice and under the snow to detect the presence of seals.

10274.	Bone probe.	King William's Land.	Capt. C. F. Hall.
10275.	Bone probe.	"	"
10276.	Bone probe.	"	"
2000.	Bone probe.	Northeastern Coast.	S. F. Baird.
2179.	Bone probe.	"	"
2180.	Bone probe.	"	"
[1]2181.	Bone probe.	"	"

[1] These probes are sometimes supplied with a detachable head.

Prodding-instruments.

Probing-awls.

Used in piercing the base of the brain in killing fish for the table.

29418. Large steel prod, suitable for large fish. A. R. Crittenden, Middletown, Conn.

II. IMPLEMENTS FOR SEIZURE OF OBJECT.

**Scooping-instruments.*

6. SCOOPS.

†For hand-use.

Shovels.

Clam-shovels.

——. [1]Long-handled shovel. U. S. Fish Commission.
26716. [1]Short-handled shovel. U. S. Fish Commission.

Oyster-shovels.

26717. (Model, with Chesapeake oyster-canoe, No. 25003). T. B. Ferguson, Maryland Commissioner of Fisheries.

Trowels used in taking burrowing shore animals.

——. Collector's trowel (flat). To be supplied.
——. Collector's trowel (round). "

Hand-scoops used in collecting mollusks.

——. [1]Spoon-scoop. U. S. Fish Commission.

Bait-ladles.

32652. "Bait-heaver" (straight). Gloucester, Mass. G. Brown Goode.
32653. "Bait-heaver" (one-sided). " "

Hand-dredges (used in collecting mollusks).

26718. Tin hand-dredge. U. S. Fish Commission.

Pile-scrapers.

26719. Frame of pile-scraper. U. S. Fish Commission.

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[1]It is thought unnecessary to exhibit these familiar implements.

†† *For use with sounding-lines.*[1]

Armed leads.

Common "deep-sea lead."
Deep-sea-sounding apparatus.

Cup-leads.

Scoop sounding-machine.

** *Grasping-hooks.*

7. HOOKED INSTRUMENTS. (Those used with a single motion, that of hooking.)

Single-pointed hooks.

Gaff-hooks.

25495. Salmon-gaff hook and staff. Bradford & Anthony, Boston, Mass.
2668. Gaff-hook. U. S. Fish Commission.
29388. Halibut-gaff. M. W. Grant, Wellfleet, Mass.
32678. Halibut hand-gaff. Gloucester, Mass. G. Brown Goode.
32683. Halibut deck-gaff. " "
25935. Haddock hand-gaff. A. McCurdy, Gloucester, Mass.
29390. Haddock-gaff. M. W. Grant, Wellfleet, Mass.
25938. Codfish-gaff. Used in George's Bank fisheries. A. McCurdy, Gloucester, Mass.
25939. Dory cod-gaff. Used in shore fisheries. A. McCurdy, Gloucester, Mass.
25934. Hand-gaff. Used in halibut fisheries. A. McCurdy, Gloucester, Mass.
29389. Cod-gaff. M. W. Grant, Wellfleet, Mass.
26187. Gaff-hook. Indians of Northwest coast. J. G. Swan.
26680. Gaff-hook. Property of J. H. Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Co.
32716. "Pew." Used in handling fish on wharves and decks. Capt. S. J. Martin, Gloucester, Mass.
32385. "Pew-gaff." Used in pitching fish from dories to vessels. Gloucester, Mass. G. Brown Goode.
32730. Fish-fork (three tines, short handle). Gloucester, Mass. G. Brown Goode. Used in pitching fish in a dory, or from hold of vessel.
32691. Halibut-cutter's hook. Used by the "header" in decapitating halibut. Gloucester, Mass. G. Brown Goode.
32684. Fish-fork (two tines). Gloucester, Mass. G. Brown Goode.
32725. "Nape-boner" hook. Used in the preparation of boneless fish. Gloucester, Mass. G. Brown Goode.

Boat-hooks.

Arranged with "Accessories of fishing-boats," B. 48.

Rabbit and squirrel hooks, used by Indians.

——. Squirrel-hooks. Pi-Ute Indians. Southern Utah. J. W. Powell.

[2]Clam-hooks, hoes, and picks used in gathering shell-fish.

[1] See exhibit of Navy Department.
[2] It is thought unnecessary to exhibit these familiar implements.

Single-pointed hooks.

[1]Forks used in handling salted and dried fish.

Whalemen's hooks.

Blubber-hooks.

25930. Blubber-hook. For hauling small pieces of blubber. E. B. & F. Macy. New Bedford, Mass.

26133. Blubber-hook. Alieut Eskimo. Nunivak Island, Alaska. W. H. Dall.

Blubber forks and pikes.

25615. Blubber-pike. Used for tossing blubber into try-kettle. Humphrey S. Kirby, New Bedford, Mass.

25617. Blubber-pike. From the storeroom of a returned whaler. Humphrey S. Kirby, New Bedford, Mass.

Junk-hooks, etc.

For hauling heavy pieces of blubber.

25616. Gaff-hook. Used to haul blubber across the deck from chopper to try-kettle. Humphrey S. Kirby, New Bedford, Mass.

25916. Junk-hook. E. B. & F. Macy, New Bedford, Mass.

[2]Lance-hooks.

Many-pointed hooks.

[2]Can-hooks.

[3]Grappling-irons.

Lip-hooks or grapnels, used by whalers.

25918. Whaler's grapnel. Used for towing whale to ship. E. B. & F. Macy, New Bedford, Mass.

Line-hooks, used by whalers.

25924. Whaler's line-hook for catching line, &c. E. B. & F. Macy, New Bedford, Mass.

Clam-rakes.

29466. Clam-hoe. Provincetown style. Wm. H. Hesbolt, Provincetown, Mass.

29437. Hand-claw. Used for gathering "hen-clams" and "scallops." Wellfleet, Cape Cod, and coast of Maine. M. W. Grant, Wellfleet, Mass.

——. Clam-rake (model). Used in collecting the sea-clam (*Mactra solidissima*) on Nantucket Shoals. These clams are salted down and used as bait for cod, halibut, &c. See with model of Nantucket dory (26257).

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[1]It is thought unnecessary to exhibit these familiar implements.

[2]Arranged with boat fittings.

[3]Arranged with the anchors.

Many-pointed hooks.

Many-pointed fish-jigs.

29436. Mackerel-gaff. Used when the mackerel swim close in large shoals. M. W. Grant, Wellfleet, Mass.
29441. Mackerel-bob. Used when the mackerel are close to the vessel and in large schools. Wm. H. Hesbolt, Provincetown, Mass.

Oulachan rakes or spears.

Used by Indians of the Northwest coast in the capture of the oulachan or candle-fish (*Osmerus pacificus*).
——. Oulachan rake or comb. Flathead Indians. J. G. Swan.

Squid-jigs.

25848. Squid-jig. George P. Steel, Provincetown, Mass.
25714. Squid-jig. " "
25776. Squid-jig. Gloucester style. A. R. Crittenden, Middletown, Conn.
29443. Squid-jig. Over fifty years old. Lemuel Cook, 2d, Provincetown, Mass.
32721. Squid-jig. Capt. R. H. Hurlbert, Gloucester, Mass.
32722. Squid-jig. " "
25683. Squid-line and jig. Used in catching squid for bait. Bradford & Anthony, Boston, Mass.
29447. Molds used in forming squid-jigs. John B. Parsons, Rockport, Mass.

Twisting-rods (used in drawing small mammals from their burrows).

——. Twisting-rod. Virginia.

8. Barbed Implements. (Those used with two motions, the first that of thrusting.)

Spears with fixed heads.

Barbed spears (with single point).

25594. Crab-spear, used about Newport, R. I. J. M. K. Southwick, Newport, R. I.
25595. Flounder-spear. J. M. K. Southwick, Newport, R. I.
——. "Conch" harpoon. Used by Bahamians and fishermen of Key West in the capture of large fish. Dr. J. W. Velie, Chicago, Ill.

Eel-spears.

——. Eel-spear with six prongs for winter fishing. Lent by Bradford & Anthony, Boston, Mass.
25558. Eel-spear with ten prongs for winter fishing. "
25557. Eel-spear for summer fishing. "
25556. Nine fish-spears. "
25224. Eel-spear, used in southern New England. U. S. Fish Commission.
25647. New Bedford eel-spear. H. S. Kirby, New Bedford, Mass.
25606. Eel-spear, Boston pattern.. Used on Cape Cod. J. M. K. Southwick, Newport, R. I.

Spears with fixed heads.

Aboriginal fish-spears.

7420. Head of fish-spear. Eskimos. Fort Anderson, Arctic coast. R. McFarlane.
?675. Heads of fish-darts. Eskimos. Mackenzie's River district. R. McFarlane.
7514. Head of fish-spear, made of elk-horn. Eskimos. Northwest coast. Geo. Gibbs.
2322. Head of salmon-spear. Indians. Fort Crook, Oreg. Lieut. John Feimer, U. S. A.
2628. Fish-dart heads. Indians. Columbia River. U. S. Exploring Expedition. Capt. C. Wilkes, U. S. N.
1439. Lance-head of bone. Indians. New Mexico. Lieut. A. W. Whipple, U. S. A.
18933. Fish-spears. Sitka Indians. Sitka. J. G. Swan.
11429. Salmon-spears. Passamaquoddy Indians. Eastport, Me. E. Palmer.
10283. Salmon-spear. Eskimos. Igloolik. Capt. C. F. Hall.
2543. Fish-spear. Tschutschi Indians. South Pacific Exploring Expedition. Capt. John Rodgers, U. S. N.
23518. Three-pronged spear. Northwest coast. J. G. Swan.

Aboriginal bird and fish spears.

19517. Bird-spear. Eskimos. Greenland. Geo. Y. Nickerson.
10267. Bird-spear with throwing-stick. Arctic America. Smithsonian Institution.
15950. Fish-spear. Magemut Eskimos. Nunivak, Alaska. W. H. Dall.
11358. Fish or bird spear. Eskimos. Bristol Bay, Alaska. Vincent Colyer.
15689–90–91–93–94–95–96. Bird-spears. Eskimos. Nunivak Islands, Alaska, W. H. Dall.
7973–7997. Fish and bird spears. Mushegay Indians. Alaska. Smithsonian Institution.

Spears with detachable heads.

Lily-irons.

25230. Sword-fish lily-iron. Capt. John B. Smith. U. S. Fish Commission.
25645. Sword-fish dart and socket, peculiar to New Bedford. A. R. Crittenden, Middletown, Conn.
32714. Sword-fish lily-iron. Adolph Voss, Gloucester, Mass.
32715. Sword-fish lily-iron. " "
25208. Swordfish-dart head. Wilcox, Crittenden & Co., Middletown, Conn.
——. "Turtle-peg" harpoon. Key West, Fla. Dr. J. W. Velie, Chicago, Ill.

Eskimo harpoons of stone, bone, and iron.

14255. Iron harpoon-head, with line of walrus hide. Eskimos. Smith Sound. Capt. C. F. Hall.
10120. Harpoon-head, brass and iron. Eskimos. Victoria Harbor. Capt. C. F. Hall.
9838. Harpoon-heads of bone and iron. Eskimos. Northeast coast. S. F. Baird.

Spears with detachable heads.

Eskimo harpoons of stone, bone, and iron.

19522. Harpoon-head of stone and bone. Eskimos. Greenland Geo. Y. Nickerson.

10136. Head of walrus-harpoon. Eskimos. Igloolik. Capt. C. F. Hall.

10400. Head of seal-harpoon. Eskimos. Igloolik. Capt. C. F. Hall.

10407. Bone harpoon-head. Eskimos. King William's Sound. Capt. C. F. Hall.

10404. Part of ancient Innuit harpoon-head. Repulse Bay. Capt. C. F. Hall.

10273. Handle of whaling-harpoon made of bone and wood. Eskimos. Greenland. Smithsonian Institution.

19519. Handle of whaling-harpoon made of wood and bone. Eskimos. Greenland. Geo. Y. Nickerson.

10265. Whaling-harpoon. Eskimos. Northwest coast. Smithsonian Institution.

19518. Whaling-harpoon of recent manufacture, with head of bone and iron, handle of wood and iron, and seal-skin line. Eskimos. Greenland. Geo. Y. Nickerson.

565. Harpoon-head of bone and iron with walrus-hide line. Eskimos. Port Foulke. Dr. I. I. Hayes.

2186. Seal-harpoon head of bone and iron. Eskimos. Anderson River. R. McFarlane.

13140. Walrus-harpoon head of bone and iron, hide line. Innuit Eskimos. Greenland. S. F. Baird.

19376. Bone harpoon-head with hide line. Eskimos. Alaska. Rev. James Curley.

11618. Seal-harpoon head of bone. Eskimos. Nunivak Islands, Alaska. W. H. Dall.

15631. Miniature model of seal-harpoon. Eskimos. Alaska. H. W. Elliott.

1678. Miniature model of seal-harpoon. Eskimos. Alaska. W. H. Dall.

16120–21–23–25, 5606–7621. Seal-harpoon heads of bone and iron. Eskimos. Nunivak Islands, Alaska. W. H. Dall.

15619. Harpoon-head of bone. Eskimos. Alaska. H. W. Elliott.

2674. Seal-harpoon heads of bone. Anderson River Eskimos. Fort Anderson. R. McFarlane.

2092, 2250, 2817, 3975, 5815, 7422, 7440. Seal-harpoon heads of bone and iron. Anderson River Eskimos. Mackenzie's River district. R. McFarlane.

——. Indian harpoons of shell and iron. Whaling-harpoon, used by Makah Indians of Vancouver's Island and vicinity.

4131. Four models of whaling-harpoons, lines and throuts. Makah Indians. Neah Bay, Wash. J. G. Swan.

1869. Head of whaling-harpoon, with line. Makah Indians. Cape Flattery, Wash. Geo. Suckley.

This harpoon-head is made from the shell of a large species of *Mytilus*, and illustrates the methods of manufacture employed by Indians of the Northwest coast previous to the introduction of metal by the white man.

20896–7. Head of whaling-harpoon and line. Makah Indians. Sitka, Alaska. J. G. Swan.

This harpoon-head is constructed of sheet-iron and shows the method now employed in the manufacture of the weapons. The rope and covers are made from the bark of *Thuja gigantea*.

828. Head of whaling-harpoon with line. Makah Indians. Neah Bay, Wash. Ter. J. G. Swan.

Spears with detachable heads.

Eskimo harpoons of stone, bone, and iron.

1868. Head of whaling-harpoon with line. Makah Indians. Neah Bay, Wash. Ter. J. G. Swan.
26875–26825. Handles of whaling-harpoons. Makah Indians. J. G. Swan.
2530. Harpoon-darts. Eskimos. Alaska. North Pacific Exploring Expedition. Capt. John Rodgers.
16675. Harpoon-dart. Kotzebue Sound. W. H. Dall.
5775–6–7–9–80. Harpoon-darts. Sitka, Alaska. W. H. Howard. U. S. R. M.

Harpoon-spears.

6564. Head of barbed fish-dart, made of native copper. Eskimos. Sitka, Alaska. Dr. T. T. Minor.
9083. Head of barbed fish-dart, made of native copper. Alaska. Lieut. F. W. Ring, U. S. N.
20653. Head of barbed fish-dart of native copper with line of twisted sinew. Alaska. Smithsonian Institution.
21413. Fish-spear with detachable barb. Hoochuon Indians. South Eel River, California. Stephen Powers.
Double-pronged spears with detachable heads. McCloud River Indians, Shasta Co., Cal. Livingston Stone. These spears are used in the capture of the *Salmo quinnat*. The handles are thirty feet in length. The barbs are made from the splint bones of deer. See No. 13743, below.
19046. Fish-spear with detachable barbs. Cooyunu Pi-Ute Indians. Pyramid Lake, Nevada. Stephen Powers.
23522. Two-pronged spear with detachable barbs. Indians of Northwest coast. J. G. Swan.
26826. Handle of spear similar to 23522, but longer. J. G. Swan.
23520. Spear with many-barbed detachable head and kelp line. Indians of Northwest coast. J. G. Swan.
13743. Points for salmon-spear made of the splint bones of the deer. McCloud River Indians. Shasta Co., Cal. Livingston Stone.
650. Harpoon-arrows with iron tips. Indians. Cape Flattery, Wash. Ter. Geo. Gibbs.
21308. Wooden barbs for fish-harpoon. Indians. Hoopah Valley, Cal. Stephen Powers.
2249. Head of fish-harpoon. Eskimos. Anderson River. R. McFarlane.
11356. Harpoon-dart with bladder-float. Nashegay Indians. Alaska. Dr. T. T. Minor.

9. Tongs, &c.

†*For hand-use.*

Tongs (with two handles).

Oyster-tongs and oyster-rakes.

26110. Oyster-tongs. S. Salisbury, Providence, R. I.
26109. Oyster-tongs. " "
25205. Oyster-tongs. Wilcox, Crittendon & Co., Middletown, Conn.
29111. Oyster-nippers. S. Salisbury, Providence, R. I.

"Nippers" (with cord and handle).

Snake-tongs.
Sponge-tongs.
Coral-tongs.

†† *For use with sounding-lines.*

"Clamms" for deep-sea soundings (forceps closed by a weight).[1]

(Ross' "deep-sea clamms.")
(Bull-dog sounding-machine.)

*** *Grasping-lines.*

10. NOOSES.

† *Stationary nooses.*

Jerk-snares.

Bird-snares.
Fish-snares of wire, gut, hair, &c.

†† *Thrown nooses.*

Lariats and lassos.

11344. Lariat of hide. Apache Indians. General M. C. Meigs, U. S. A.
8534. Lariat of hide. Sioux Indians. Nebraska. Dr. S. M. Horton, U. S. A.
1912. Lariat of hide. Sioux Indians. Upper Missouri River. Lieut. G. K. Warren.
6920. Lariat of hide. Comanche Indians. Fort Cobb, Ind. T. E. Palmer.
6921. Lariat of hide. Comanche Indians. Llano Estacado, Texas. E. Palmer.
5559. Lariat of hide. Apache Indians. E. Palmer.
7492. Lariat of moose-skin. Mackenzie River Indians. Fort Anderson. R. McFarlane.
11206. Lariat of rope. Pi-Ute Indians. Southern Utah. Maj. J. W. Powell.
5558. Lariat of buffalo-hair. Apache Indians. E. Palmer.
7317. Lariat of buffalo-hair. Apache Indians. Maj. W. H. Mills, U. S. A.
9034. Lariat of buffalo-hair. Nez Percé Indians. Idaho. Dr. E. Storror.
6922. Lariat of buffalo-hair. Comanche Indians. Fort Cobb, Ind. Ter. E. Palmer.

11. LOADED LINES. (Bolas.)

Bird-slings (used by Eskimos).

19507. Bird-sling. Greenland. J. H. Clark. Smithsonian Institution.
9831. Bird-sling. Greenland. S. F. Baird. " "
7444. Bird-sling. McKenzie's River. Fort Anderson, H. B. T. R. McFarlane.
9831. Bird-sling. Greenland. S. F. Baird.
7537. Bird-sling. Arctic coast. Fort Anderson, H. B. T. B. R. Ross.

[1] See exhibit of Navy Department.

****Entangling-lines.*

12. TANGLES.

The tangles are employed by naturalists for the purpose of gathering small spiny animals, such as sea-urchins and star-fishes, from the bottom at considerable depths. They adhere to the fibers of the spun-yarn in great numbers. It has been thought that this instrument might advantageously be employed in freeing oyster-beds from their worst enemies, the star-fish.

Swab-tangles.

Swab-tangles.

26844. Swab-tangle. U. S. Fish Commission.

(Dredge-tangles, used by English collectors.)

Harrow-tangles.

Harrow-tangles.

26845. Models of harrow-tangles. U. S. Fish Commission. Formerly used by the Fish Commission, now replaced by the wheel-tangles.

Wheel-tangles.

Wheel-tangles.

26846. Model of wheel-tangle. U. S. Fish Commission.
26848. Wheel-tangles. U. S. Fish Commission.

III. MISSILES.

Simple missiles (those propelled by the unaided arm).

13. HURLED WEIGHTS.

Stones and disks (thrown by the hand).
Weights (dropped from an elevation, dead-falls, not automatic).

14. HURLED STICKS.

Straight sticks.

Clubs used as missiles.

Curved sticks.

Throw-sticks, used by the Moqui Indians of New Mexico in hunting rabbits.

9543–4. Throw-sticks. Used in rabbit-hunting by Moqui Indians. New Mexico. Dr. Edward Palmer.

15. HURLED SPEARS.

Darts and lances.

See under "Lances and spears," above enumerated, many of which may be used as missiles.

** *Centrifugal missiles.* (*Propelling power augmented by an artificial increase of the length of the arm.*)

16. SLINGS AND SPEARS THROWN BY STRAPS.

Slings.

9532. Sling. Navajo Indians. Smithsonian Institution.
17234. Sling. Indians. " "

Spears (with straps),

17. MISSILES PROPELLED BY "THROWING-STICKS."

Spears (with throwing-sticks, used by Eskimos).

See above under "Bird and fish spears," particularly No. 10267, a spear with throwing-stick attached.

7899. Throwing-stick. Eskimos. Aleutian Islands. Dr. T. T. Minor.
7933. Throwing-stick. Eskimos. Kodiak. "
16076. Throwing-stick. Eskimos. Unalashka. W. H. Dall.
2533. Throwing-stick. Eskimos. Alaska. North Pacific Exploring Expedition. Capt. John Rodgers.
11346–47. Throwing-sticks. Yukon River, Alaska. Vincent Colyer.
15643. 1642–16243. Throwing-sticks. Eskimos. Nunivak Islands. W. H. Dall.
2267. Throwing-stick. Eskimos. Smithsonian Institution.
5774. Throwing-stick. Eskimos. Sitka. W. A. Howard, U. S. R. M.
20771. Throwing-stick. Eskimos. Sitka. J. G. Swan.

*** *Missiles propelled by a spring.*—(*Spring consisting of bent rod.*)

18. BOWS AND ARROWS.

Bows.

Simple bows.

(Cross-bows.)

(Ballistas.)

These articles are arranged with the Ethnological series, as are also the arrows, with the exception of a few forms peculiarly adapted to hunting.

Arrows.

Hunting-arrows.

11350–54. Bird-arrows. Eskimos. Bristol Bay, Alaska. Vincent Colyer.
16410–11–12. Bird-arrows. Eskimos. Nunivak Islands, Alaska. W. H. Dall.

Arrows.

Hunting-arrows.

8827–28–29–30. Bird-arrows. Eskimos. Alaska? Smithsonian Institution.
5602. Bird-arrows. Yukon River, Alaska. W. H. Dall.
15654. Hunting-arrows. Kodiak Indians. Alaska. W. H. Dall.
16413–14–15. Hunting-arrows with heads of bone and iron. Eskimos. Nunivak Islands, Alaska. W. H. Dall.
——. Hunting-arrows with bone heads. Eskimos. Nunivak Islands, Alaska. Vincent Colyer.

Harpoon-arrows, used in fishing.

11348–52. Harpoon-arrows. Eskimos. Bristol Bay, Alaska. Vincent Colyer.
15677–15681–82. Harpoon-arrows. Eskimos. Nunivak Islands, Alaska. W. H. Dall.
19379. Harpoon-arrow. Eskimos. Alaska. Rev. J. Curley.
8005–6–9. Harpoon-arrows. Eskimos. Nushegay Indians. Dr. T. T. Minor.

Accessories of bows and arrows.

Holders.*
Quivers.*
Arrow-head pouches.*

Implements of manufacture.

Flint-chipping apparatus.*
Arrow-head sharpeners.*
Shaft-gauges.*
Cord-twisting apparatus.*
Shaft-polishers.*
Glue-sticks, used in fastening head of arrow.*

Arranged with the Ethnological series.

‡‡ *Spring consisting of elastic cord.*

19. INDIA-RUBBER SLINGS.

Pea-shooters (used in killing birds).

‡‡‡ *Spring consisting of metallic helix.*

20. SPRING-GUNS.

Spring-guns.

**** *Missiles propelled by the compression of air or water.*

21. AIR-GUNS.

Blow-guns (missile propelled by the breath).

Blow-guns carrying arrows.
Blow-guns carrying balls.

Piston air-guns.
Reservoir air-guns.

Air-guns.

29535. Bedford Eureka air-pistol, with darts, slugs, and gun-rest. (Patented Dec. 21, 1875.) Eureka Manufacturing Company, Boston, Mass.

Air-gun canes.

22. WATER-GUNS.

Syringe-guns.

Humming-bird guns.

**** *Fire-arms.*

23. GUNS AND PISTOLS.

Muzzle-loading arms.

26714. Flint-lock gun (single barrel) old fashion. Smithsonian Institution.

809. Single-barrel shot (?) gun.
Given by Lord Melville to Sir John Franklin, who used it on his unfortunate expeditions in 1820, 1821, and 1822, then given by Sir John to his interpreter, St. Germain, who sold it to Chief Factor Smith, of the Hudson Bay Co., who gave it to his son-in-law, Chief Factor McPherson, from whom it was obtained by B. R. Ross, of the Hudson Bay Co.

Breech-loading arms.

25894. Six-shooting shot-gun. Colt's Fire-Arms Manufacturing Company, Hartford, Conn.

25895. Double-barreled breech-loading fowling-piece. E. Remington & Sons, Ilion, N. Y.

25247. Double-barreled breech-loading fowling-piece. Damascus steel, 12 gauge. Parker Bros., Meriden, Conn.

25250. Single-barreled breech-loading shot-gun. (Patented May 26, 1874. Phœnix calibre 12.) Whitney Arms Company, Whitneyville, Conn.

26574. Breech-loading gun. Clark & Sneider, Baltimore, Md.

26573. Breech-loading gun. " "

29533. The Sneider patent double-barrel breech-loading shot-gun. Clark & Sneider, Baltimore, Md.

29534. The Sneider double-barrel breech-loading shot-gun; solid tip grip. (Patented Dec. 22, 1868; April 7, 1874.) Clark & Sneider, Baltimore, Md.

25896. Creedmoor rifle. E. Remington & Sons, Ilion, N. Y.

——. Mid-range rifle. Peabody & Martin pattern (44 cal., 100 grs.), made by Providence Tool Co. Schuyler, Waltham & Graham, New York.

25890. Sporting-rifle. King's improvement. (Patented March 29, 1866; October 16, 1860. Model, 1873. Calibre .44.) Winchester Repeating Arms, New Haven, Conn.

22202. Sharpe's rifle. (Patented April 1, 1866.) Manufacturers.

29289–311. Maynard's rifle with appurtenances. (Pistol grip, vernier rear-sight. Front wind-gauge sight and spirit-level; 32 inches, .4 calibre.) Massachusetts Arms Company, Chicopee Falls, Mass.

Breech-loading arms.

29299. Shot-barrel for Maynard's rifle; 32 inches, .64 calibre. Massachusetts Arms Company, Chicopee Falls, Mass.

25873. Six-shooting rifle; 44-inch calibre. Colt's Fire-Arms Manufacturing Company, Hartford, Conn.

25889. Carbine. King's improvement. (Patented March 29, 1866; October 16, 1860. Model 1873. Calibre .44.) Winchester Repeating Arms, New Haven, Conn.

25248. Breech-loading sporting-rifle. (Patented October 17, 1866. Reissued June 25, 1872; Dec. 26, 1865. Reissued Oct. 1, 1867; May 15, 1866; July 16, 1872.) Whitney Arms Company, Whitneyville, Conn.

25249. Breech-loading sporting-rifle. Phœnix calibre, 44. Whitney Arms Company, Whitneyville, Conn.

25892. Six-shooting revolver. 45 calibre. (Patented Sept. 19, 1871; July 2, 1872.) Colt's Fire-Arms Manufacturing Company, Hartford, Conn.

Whaling-guns.

24986. C. C. Brand's improved whaling-gun. Patented June 22, 1852. For use with C. C. Brand's improved bomb-lance. 24987. Powder-flask with charger. 24988. Wad-cutter. 24989. Wad-cutter (inside). 24992. Prepared wads. 24990, 24991. Screw-drivers. C. C. Brand, Norwich, Conn.

24993–97. C. C. Brand's improved bomb-lance. Patented June 22, 1859. For use with C. C. Brand's improved whaling-gun. 24997. Exploded lance. 24998. Lance-hook (for drawing charge). C. C. Brand, Norwich, Conn.

25251. E. Pierce's harpoon-gun. Patented 1865. U. S. Fish Commission.

26897. Cunningham & Hogan's breech-loading bomb-gun, with explosive lances. William Lewis, New Bedford, Mass.

24. (Accessory.) Ammunition and its preparation.

Explosives.

Gunpowder.
Gun-cotton.
Percussion powder:
- Caps.
- Needle percussion.
- Primers.

Wood powder.
Dynamite or giant-powder.
Nitroglycerine.
Dualine.
Lithofracteur.
Colonia powder.
Other explosives.

For obvious reasons this series could not be exhibited.

Missiles.

Bullets.

(Accessory.) Bullet-molds.

29300. Pair of molds for conical and cylindrical bullets. Massachusetts Arms Company, Chicopee Falls, Mass.

Shot.

——. Series of samples of shot, sizes from No. 000 to No. 12. Thomas Sparks, Philadelphia, Pa.

Explosive bullets, shells, &c.:
Bomb-lance.

Wadding.

Bulk wadding.
Prepared wads.
(Accessory.) Wad-cutters.

The articles of this class may be seen in connection with the ammunition series.

Ammunition-measures.

Measures.
Shot-measures.
Powder-measures. } Attached to pouches and separate.

16190. Powder-charger. Nunivak Islands, Alaska. W. H. Dall.
2689. Gun-charger. Indians of Northwest coast. Captain Wilkes, U. S. N. U. S. Exploring Expedition.

Weighing scales.

Prepared ammunition.

Ball, shot, and wire cartridges.

25891. Card of rim-fire cartridges. Winchester Repeating Arms, New Haven, Conn.
29304. Ten metallic cartridge-shells, .4, for rifle. Massachusetts Arms Company, Chicopee Falls, Mass.
29305. Ten metellic cartridge-shells, .64, for shot-guns. Massachusetts Arms Company, Chicopee Falls, Mass.

Methods of preparing cartridges.

Loaders, crimpers, and cappers.

29303. Metallic loader for rifle-cartridge. Massachusetts Arms Company, Chicopee Falls, Mass.

Methods of preparing cartridges.

Loaders, crimpers, and cappers.

29302. Rosewood loader for shot-cartridge. Massachusetts Arms Company, Chicopee Falls, Mass.
29308. Two rosewood loading-blocks. Massachusetts Arms Company, Chicopee Falls, Mass.
25897. Cartridge-loading machine. E. Remington & Sons, Ilion, N. Y.
29306. Cartridge-capper. Massachusetts Arms Company, Chicopee Falls, Mass.

25. ACCESSORIES OF LOADING, CLEANING, AND REPAIRING, SIGHTING, AND TESTING FIRE-ARMS.

Instruments for cleaning, loading, &c.

Rammers.
Swabs.
Charge-drawers—"worms"—and other loading tools.

These may be seen attached to the various wrappers.

29307. Wrench and cap-picker. Massachusetts Arms Company, Chicopee Falls, Mass.
29311. Rod and tip for cloth, plain. Massachusetts Arms Company, Chicopee Falls, Mass.
29310. Jointed rod and brush. Massachusetts Arms Company, Chicopee Falls, Mass.
29309. Screw-driver. Massachusetts Arms Company, Chicopee Falls, Mass.
7525. Gun-screw-driver. Apache Indians. Arizona. E. Palmer.
26695. Loading-tools. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.
26696. Closer. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.
29251. Oil-bottle, nickel (No. 1). Edwin W. Judge, New Haven, Conn.
29252. Oil-bottle, nickel (No. 2). " "
26698. Oil-can. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.

Sights, &c.

Muzzle-sights.
Slit-sights.
Globe-sights.
Peep-sights.
Breech-sights.
Plain-sights.
Graduating-sights.
Telescope-sights.
Levels, attached to guns.
Wind-gauges.

These may be seen attached to the guns.

Recoil-checks.

25700. William D. Miller's patent recoil-check for shot-guns and rifles. (Patented Nov. 2, 1875, No. 52.) A. J. Norman, New York.
Advantages claimed for this arrangement are that it repels and neutralizes the recoil, permits steadier aim, and insures increased range and greater penetration.

26. For carrying arms and ammunition.

Ammunition-holders.

Powder-horns:

Horns.

Flasks.

Canisters.

1910. Powder-horn. Sioux Indians. Upper Missouri River. Lieut. G. K. Warren, U. S. A.
1472. Powder-horn. Comanche Indians. General D. N. Couch, U. S. A.
16309. Powder-horn. Sitka, Alaska. W. H. Dall.
1909. Powder-horn and pouch. (Containing bullets, gun-flints, and arrow-points.) Sioux Indians. Upper Missouri River. Lieut. G. K. Warren, U. S. A.
5520. Powder-horn. Papago and Apache Indians. E. Palmer.
21672. Powder-horn and pouch. Yankton Sioux. Dakota. Army Medical Museum. Dr. J. T. Boughter.
26706. Cartridge-box. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.
26703. Cartridge-flask. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.
7313. Powder-flask. Apache Indians. Major Mills, U. S. A.
13035. Powder-flask. Aleut Eskimos. Ounalashka. W. H. Dall.
16099. Powder-flask. Magemut Eskimos. Nunivak Islands, Alaska. W. H. Dall.
9290. Powder-flask. Alaska. Dr. A. H. Hoff, U. S. A.
5184. Powder-flask. Porterre Indians. Dr. J. T. Rothrock, U. S. A.
16292. Powder-flask. Kodiak Eskimos. Chirikoff. W. H. Dall.

Shot and bullet holders.

Pouches.

——. Shot-pouch. Found in old house, Saint Regis, N. Y. R. B. Hough.
20673. Shot-pouch. Indians of the Northwest coast. Fort Simpson, B. C. J. G. Swan.
9641. Bullet-pouch. Navajo Indians. E. Palmer.
11077. Bullet-pouch. Navajo Indians. Northwestern New Mexico. Vincent Colyer.
2112. Bullet-pouch. Indians of Upper Missouri. War Department, U. S. A.
6199. Bullet-pouch and belt. Delaware Indians. Arizona. E. Palmer.
2470. Bullet-pouch and belt. Indians of Missouri Valley. War Department, U. S. A.
5432. Bullet-pouch and belt. J. Varden.
26699. Ball-box. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.
1935. Bullet-pouch and belt. Indian.

Shot and bullet holders.

Cap-holders.

5525. Cap-case. Apache Indians. Arizona. E. Palmer.
26697. Cap-box. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.

Pouches.
Boxes.
Cap-straps, used by Indians.

Cartridge-holders:
Pouches.
Boxes.
Belts.
Vests.

Weapon-holders.

Slings for arms:
Shoulder-slings.
Saddle-slings.
Holsters.
Belts:
Pistol-belts.
Racks and cases:
Gun-racks.
Gun-cases.

8546. Gun-case. Indians. Ogalalla, Nebr. Dr. S. M. Horton, U. S. A.
14849. Gun-case. Indian. Colorado. Maj. J. W. Powell.
26705. Gun-case. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest and Stream Publishing Company.
26704. Gun-case. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest and Stream Publishing Company.

IV. BAITED HOOKS. ANGLING-TACKLE.

27. Hooks with movable lines.

Tackle for surface-fishing.

Fly-fishing tackle.
Salmon-tackle.
Trout-tackle.
Black-bass tackle.
Shad-tackle.

Tackle for surface-fishing.

Trolling-tackle:

Trolling-tackle.
Whiffing-tackle.
Drailing-tackle.
Gangs of hooks for minnow-bait.

The parts of these gears may be seen in their proper places, with hooks, lines, &c.

26683. Minnow-gang. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest and Stream Publishing Company.

Surf-tackle for throwing and hauling.

Striped-bass tackle.
Red-fish or bass tackle.
Blue-fish tackle.
Tide-drailing tackle.
Pasque and Cuttyhunk bass-tackle.

24808–9. Blue-fish line. Rigged with eel-skin squids. J. M. K. Southwick, Newport, R. I.
24802–7. Blue-fish lines. Rigged with cloth squid. Block Island. J. M. K. Southwick, Newport, R. I.

Tackle for fishing below the surface.

Short hand-gear.

25684. Mackerel-lines and cleats. Bradford & Anthony, Boston, Mass.
25940. Mackerel hook and line. A. McCurdy.
29293. "Otter," with line and flies attached. Used in lake and river fishing. William Morris, Lake City, Minn.
19047. Throw-line with minnow-hooks. Cooyuwee Pi-Utes. Pyramid Lake, Nevada. Stephen Powers.

Deep-sea gear.

25786. Hand-line gear for halibut and cod. Used in George's Banks fisheries. Alexander McCurdy, East Gloucester, Mass.
25687. Gear, used by American fishermen on George's Banks. Bradford & Anthony, Boston, Mass.
29471. Hand-line gear. Used in George's Banks cod and halibut fisheries. A. McCurdy, East Gloucester, Mass.
29483. Cod-fishing gear. Used from 1812–1830. Lemuel Cook, 2d, Provincetown, Mass.
25686. Cod hand-line and gear. Used chiefly on Western and Grand Banks of Newfoundland. Bradford & Anthony, Boston, Mass.
25685. Pollock line and gear. Bradford & Anthony, Boston, Mass.
24810–11. Rigged tautog-lines. J. M. K. Southwick, Newport, R. I.
25665. Lines. Rigged for pond-fishing. Wm. M. Young, Philadelphia, Pa.
1140. Halibut-hook, with kelp line. Makah Indians. Puget Sound, W. T. J. G. Swan.

Tackle for fishing below the surface.

Deep-sea gear:
- Flounder-gear.
- Shark-gear.
- Other bottom-gear.

Bobs:
- Eel-bobs.

28. HOOKS, WITH STATIONARY LINES.—SET TACKLE.

Surface lines.

Spilliards, or floating-trawl lines.

Bottom-set lines.

Trawl-lines, or bull-tows.

25688. Model of codfish-trawl, used by American fishermen on Western and Grand Banks of Newfoundland. Buoys, scale of one-sixth: anchors, scale of one-fifteenth. Bradford & Anthony, Boston, Mass.

29469. Section (one-fifth) of trawl-line. Used in George's Banks codfisheries. A. R. Crittenden, Middletown, Conn.

6560. Trawl-line and hooks. Indians of Vancouver's Island. Dr. T. T. Minor.

32705. One section or "skate" of a halibut trawl-line with (No. 32706) inner buoy with flag, (No. 32707) outer buoy with "black-ball," (No. 32708) buoy-line, and (No. 32709) anchor. Capt. Jos. W. Collins and Philip Merchant, Gloucester, Mass.

Set-traps.

25562. Pickerel-traps. With lines and flags for fishing through the ice. Bradford & Anthony, Boston, Mass.

25563. Set of implements for smelt-fishing through the ice.

25667. Fishing-bows. W. M. Young, Philadelphia, Pa.

29. (ACCESSORY.) PARTS AND ACCESSORIES OF ANGLING-APPARATUS AND OF HARPOON AND SEINE LINES.

Hooks (including a full series of unmounted hooks, of recent and aboriginal manufacture).

Plain hooks.

25682. The ten processes through which American hand-made fish-hooks pass from the wire to the finished hook. Made entirely by hand-labor in the factory of J. W. Court, Brooklyn, N. Y. Bradford & Anthony, Boston, Mass.

25524. Double-refined, cast-steel, tapered point; Virginia hooks, flatted, Nos. 10 to 1 and 1–0 to 3–0. American Needle and Fish-Hook Company, New Haven, Conn.

25535. Superfine cast-steel blackfish-hooks, japanned, flatted, Nos. 1 to 8. American Needle and Fish-Hook Company, New Haven, Conn.

Hooks (including a full series of unmounted hooks, of recent and aboriginal manufacture).

Plain hooks.

25536. Eel-hooks, No. 6. American Needle and Fish-Hook Company, New Haven, Conn.

25640. Halibut-hooks, ringed; Nos. 1 to 3. American Needle and Fish-Hook Company, New Haven, Conn.

25528. Cast-steel Kirby sea fish-hooks, flatted; Nos. 1 to 12. American Needle and Fish-Hook Company, New Haven, Conn.

25530. Cast-steel Kirby sea fish-hooks, ringed; Nos. 1 to 12.

25529. Superior cast-steel Kirby sea fish-hooks, galvanized, flatted; Nos. 1 to 8. American Needle and Fish-Hook Company, New Haven, Conn.

25522. Double-refined cast-steel Kirby river and trout fish-hooks, ringed; Nos. 1 to 12 and 1–00 to 10–0. American Needle and Fish-Hook Company, New Haven, Conn.

25523. Kirby river and trout fish-hooks, flatted, extra superfine; Nos. 1 to 12 and 1–0 to 10–0. American Needle and Fish-Hook Company, New Haven, Conn.

25519. Superfine spring steel Kirby salmon, flatted; Nos. 12 to 3–0. American Needle and Fish-Hook Company, New Haven, Conn.

25520. Carlisle trout-hooks, flatted; Nos. 12–20. American Needle and Fish-Hook Company, New Haven, Conn.

25521. Carlisle trout-hooks, ringed; Nos. 8 to 3–0. American Needle and Fish-Hook Company, New Haven, Conn.

25516. Superfine cast-steel Limerick salmon, flatted; Nos. 1–0 to 12 and 2–0 to 10–0. American Needle and Fish-Hook Company, New Haven, Conn.

25517. Superfine cast-steel Limerick salmon, ringed; Nos. 1–0 to 9 and 2–0 to 10–0. American Needle and Fish-Hook Company, New Haven, Conn.

25514. Double-refined cast-steel Limerick river and trout fish-hooks (spear-points, flatted); Nos. 1–0 to 12 and 2–0 to 10–0. American Needle and Fish-Hook Company, New Haven, Conn.

25515. Double-refined cast-steel Limerick river and trout fish-hooks (spear-head points, flatted, shanks ringed); Nos. 1–0 to 12 and 2–0 to 10–0. American Needle and Fish-Hook Company, New Haven, Conn.

25518. Extra spring-steel Aberdeen trout-hooks, flatted; Nos. 8 to 4–0. American Needle and Fish-Hook Company, New Haven, Conn.

25525. Superfine spring-steel Kinsey trout-hooks, flatted; Nos. 6 to 16. American Needle and Fish-Hook Company, New Haven, Conn.

25591. Superfine steel Kinsey trout-hooks, ringed; Nos. 10 to 16. American Needle and Fish-Hook Company, New Haven, Conn.

25534. Cast-steel drop-point mackerel-hooks, large and small wire, flatted; Nos. 1 A to 5 A, and 2 B to 4 B. American Needle and Fish-Hook Company, New Haven, Conn.

25527. Superfine cast-steel J. P. cod-hooks, ringed; Nos. 1 to 8. American Needle and Fish-Hook Company, New Haven, Conn.

25526. Superfine cast-steel J. P. cod-hooks, flatted; Nos. 1 to 8. American Needle and Fish-Hook Company, New Haven, Conn.

25532. Central-draught codfish-hooks, eyed; Nos. 10 to 17. American Needle and Fish-Hook Company, New Haven, Conn.

25533. Double-refined cast-steel, original, central-draught cod or mackerel hooks, ringed; Nos. 12 to 20. American Needle and Fish-Hook Company, New Haven, Conn.

Hooks (including a full series of unmounted hooks, of recent and aboriginal manufacture).

Plain hooks.

25531. Double-refined cast-steel, original, central-draught cod or mackerel hooks, flatted. American Needle and Fish-Hook Company, New Haven, Conn.

25601. Cod-hooks. Used when fish rise to the surface. J. M. K. Southwick, Newport, R. I.

25538. Shark-hooks. Bradford & Anthony, Boston, Mass.

29465. Shark-hooks. M. W. Grant, Wellfleet, Mass.

25648. Shark-hook. (Extraordinary.) A. R. Crittenden, Middletown, Conn.

29464. Ground-shark hook. Style used forty years ago. Elisha Cook, Provincetown, Mass.

25602. Dog-fish hook with chain. Used at Newport, R. I. J. M. K. Southwick, Newport, R. I.

25641. Dog-fish hooks, ringed. American Needle and Fish-Hook Company, New Haven, Conn.

29467. Horse-mackerel hook. John Thomas, Belfast, Me.

29505. Hooks, probably lost by a French fishing-vessel. Found on St. George's Banks on a piece of trawl; fished up by Geo. H. Lewis, Provincetown, Mass.

32732. French cod-hooks; taken from codfish on Jeffries Ledge. Capt. James Tarr, Gloucester, Mass.

32731. French cod-hook; taken from codfish in Salvages' Shoals, Cape Ann, in 1856. Capt. James Tarr, Gloucester, Mass.

20654. Wooden fish-hooks. Indians of Northwest coast. Bella Bella, B. C. J. G. Swan.

——. Fish-hooks. Indians of Northwest coast of America. Straits of Fuca, Puget Sound. U. S. Exploring Expedition.

1051. Fish-hooks. Puget Sound. George Gibbs.

9765. Fish-hook. Wallapai Indians. E. Palmer.

5583. Fish-hook of wood and bone. Gens des Fous Indians. Yukon River, Alaska. W. H. Dall.

9807. Fish-hook and line. Chilkaht Indians. Alaska. Lieut. F. W. Ring, U. S. A.

5590. Fish-hooks and sinkers. Premorska Indians. St. Michael's, Alaska. W. H. Dall.

19064. Fish-hooks. Cooyuwee Pi-Ute Indians. Pyramid Lake, Nev. Stephen Powers.

20651. Fish-hook. Bella Bella, B. C. J. G. Swan. Indian make.

9270. Halibut-hook. Alaska. Dr. Hoff, U. S. A. " "

——. Halibut-hook. Sitka, Alaska. J. G. Swan. " "

9103–4. Halibut-hooks. Alaska. Lieut. F. W. Ring, U. S. A. " "

1141. Butt-end of hemlock limb for making halibut-hook. Makah Indians. Puget Sound, W. T. J. G Swan.

16346. Halibut-hooks. Yakutat Eskimo. W. H. Dall.

2630. Fish-hook. Northwest coast of America. Capt. Chas. Wilkes, U. S. N. U. S. Exploring Expedition.

1324. Hooks and lines. Eskimo. Anderson River. C. P. Gaudet.

1989. Fish-hook. Arctic America. B. R. Ross.

5118. Fish-hook. Anderson River Eskimos. Mackenzie's River district. R. Kennicott.

5116. Fish-hook. Fort Anderson Eskimos. Mackenzie's River district. R. MacFarlane.

26822. Fish-line of kelp (*Nereocystis*), fish-hook, and bladder buoy. Makah Indians. Neah Bay. J. G. Swan.

Hooks (including a full series of unmounted hooks, of recent and aboriginal manufacture).

Plain hooks.

9807. Fishing line and hook. Chilkaht Indians. Alaska. Lieut. F. W. Ring, U. S. A.
15630. Bone fish-hook with whalebone snood. Alaska. H. W. Elliott.
16315. Fish-hook. Sitka. W. H. Dall.
652. Halibut-hooks. Indians of Northwest coast of America. George Gibbs.
20656. Halibut-hooks. Indians of Fort Simpson, B. C. J. G. Swan.
15635. Fish-hooks. Eskimos. Poonook, Alaska. H. W. Elliott.
10142. Fish-hooks. Eskimos. Victoria Harbor. Capt. C. F. Hall.
14280. Fish-hooks. Neah Bay, W. T. James G. Swan.
16116. Bone hook. Magemut Eskimos. Nunivak, Alaska. W. H. Dall.
16311. Fish-hooks. Nunivak Islands, Alaska. W. H. Dall.
1051. Fish-hooks. Capt. Chas. Wilkes, U. S. N. U. S. Exploring Expedition.
10219. Codfish-hook. Eskimos. Coast of Greenland. Capt. C. F. Hall.
2191–92. Fish-hooks of stone, bone, and iron. Fort Anderson Eskimos. Mackenzie's River district. R. Kennicott.
2093, 2248. Fish-hooks of bone and iron. Anderson River Eskimos. R. MacFarlane.
16311–12. Bone hooks and line spreaders. Thlinket Eskimos. Sitka, Alaska. W. H. Dall.
5118–7441. Hooks of bone and iron. Mackenzie's River Eskimos. R. MacFarlane.
32660. Smelt-spreader and hooks. Gloucester, Mass. G. Brown Goode.

Jigs and drails.

29448. Bass and bluefish drail. Elisha Cook, Provincetown, Mass.
29425. Bluefish-drail. Provincetown style. Lemuel Cook, 2d, Provincetown, Mass.
25555. Bluefish-drails. Bradford & Anthony, Boston, Mass.
29485. Bluefish-drail. Used in Wellfleet, Mass., about 1830. Newell B. Rich, Wellfleet, Mass.
25555. Bluefish-drails. Bradford & Anthony, Boston, Mass.
——. Bluefish-hooks. Collected by A. R. Crittenden, Middletown, Conn.
25550. Bluefish-drail. Bradford & Anthony, Boston, Mass.
25771. Bluefish-drails. (Made in the form of a squid and very killing.) Peculiar to Provincetown, Mass. Coleman Cook, Provincetown, Mass.
25553. Bluefish-drail. Wm. H. Young, Brooklyn, N. Y.
25669. Bluefish-drail. Peculiar to Hyannis, Mass. Freeman Hallett, Hyannis, Mass.
25671. Bluefish-drail. Peculiar to Chatham, Mass. Sanford Freeman, Norwichport, Mass.
25671 (†) Bluefish-drail. J. H. Bartlett & Sons, New Bedford, Mass.
25537. Series of hollow bone bluefish-squids. Nos. 1 to 3. American Needle and Fish-Hook Company, New Haven, Conn.
25668. Bluefish-drail. Peculiar to Harwichport, Mass. Sanford Freeman, Norwich, Mass.
25708. Bluefish-drail. Central Wharf Company, Provincetown, Mass.
25598. Bluefish-drail. J. M. K. Southwick, Newport, R. I.
25670. Bluefish-drail. Made at sea from jaw-bone of sperm-whale (*Physeter macrocephalus*). J. H. Bartlett & Son, New Bedford, Mass.

Hooks (including a full series of unmounted hooks, of recent and aboriginal manufacture).

Jigs and drails.

25669. Bluefish-drail. Peculiar to Hyannis, Mass. Freeman Hallett, Hyannis, Mass. When used, covered with an eel-skin.

25600. Weak-fish jigs. Used in Newport, R. I. J. M. K. Southwick, Newport, R. I.

9078. Metallic squid. Indians. Alaska. Lieut. F. W. Ring, U. S. A.

32657. Cahoon's improved trolling-hooks. (Patented March 24, 1874.) Thomas J. Gifford & Co., New Bedford, Mass.

12496. Mackerel-jigs. Cape Ann. J. P. Nason, Rockport, Mass.

32658. Mackerel-jig. Gloucester, Mass. G. Brown Goode.

29479. Mackerel-jig. John B. Parsons, Rockport, Mass.

32734. Mackerel-jigs. Used thirty years ago. A. McCurdy, Gloucester, Mass.

25599. Mackerel-jigs. J. M. K. Southwick, Newport, R. I.

25941. Mackerel-jigs. Used about the year 1840. Capt. Edward L. Rowe, Gloucester, Mass.

12495. Soapstone "jig" molds, No. 1. (Patented March 15, 1870.) Cape Ann. J. P. Nason, Rockport, Mass.

25780. Soapstone mackerel-jig mold. Capt. E. L. Rowe, Gloucester, Mass.

25781–2. Wooden, lead-lined, mackerel-jig molds. "

25721. Mackerel-jig mold. (Patented March 15, 1870; J. P. Nason, No. 2.) Central Wharf Company, Provincetown, Mass.

32656. Mackerel-jig mold. Gloucester, Mass. G. Brown Goode.

32654. Mackerel-jig ladle. " "

32661. Mackerel-jig rasp. " "

32662. Mackerel-jig file. " "

32663. Pewter for use in manufacture of jigs. Gloucester, Mass. G. Brown Goode.

29461. Codfish "trip" and "fly-jig." Styles used fifty years ago. Lemuel Cook, 2d, Provincetown, Mass.

25601. Codfish jig-hook. Used when the fish rise from the bottom. Massachusetts. A. R. Crittenden, Middletown, Conn.

Spoon-baits, plain and fluted.

25550. Fluted spoons for pickerel, bass, and trout. Manufactured by G. M. Skinner, Gananoque, Ontario. Patented United States and Canada, 1874. Bradford & Anthony, Boston, Mass.

25550. Trolling-spoons. For bass and pickerel. Bradford & Anthony, Boston, Mass.

25555. Bluefish-spoons. Bradford & Anthony, Boston, Mass.

25550. Spinners. For pickerel, trout, and bass fishing. Bradford & Anthony, Boston, Mass.

25549. Spoon-baits. For bass, pickerel, pike, and trout fishing (nickel-plated). John H. Mann, Syracuse, N. Y.

25551. Spoon-baits. For bass, pike, pickerel, and trout (silver-plated). J. T. Buel, Whitehall, N. Y.

25552. Spoon-baits. For pike, pickerel, bass, trout, and bluefish. Wm. H. James, Brooklyn, N. Y.

25553. Spoon-baits. For pike, bass, pickerel, and trout fishing. Wm. H. James, Brooklyn, N. Y.

26793. Series of fluted trolling-spoons. D. M. Skinner, Gananoque, Ontario, Canada.

26685. Spoon-hooks. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.

Hooks (including a full series of unmounted hooks, of recent and aboriginal manufacture).

Spoon-baits, plain and fluted.

26690. Trout-spoon. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest and Stream Publishing Company.

25554. Spoon-baits. For pike, pickerel, bass, and trout. W. D. Chapman & Son, Theresa, N. Y.

25666. Pearl minnows. W. M. Young, Philadelphia, Pa.

25550. MacHarg's pearl spoons. For pickerel, trout, and bass. Bradford & Anthony, Boston, Mass.

Artificial flies on hooks.

32735. Bass-flies. Sara J. McBride, Mumford, N. Y.
32736. Trout-flies. " "
26105. Salmon-flies. " "

32737. Artificial flies for salmon, trout, and bass. Bradford & Anthony, Boston, Mass.

NOTE.—For convenience this entire collection is provisionally entered under a single catalogue number.

a. Peacock, with water-color sketch of original.

b. March Brown, with water-color sketch of original.

Body—Fur of the fox-squirrel's face ribbed over with olive silk. Tail—Two strands of brown feather of the wild mallard. Wings—From the side feather of the shoveller duck approaching the tail; the light yeast-colored feather is the best, and if nicely tied must be an excellent fly. Legs—A grizzled cock's hackle, wound twice or thrice at the shoulder. For Pennsylvania, hooks Nos. 6 to 8; for New York, hooks Nos. 5 and 6; New England, hooks Nos. 4 and 5.

c. Great Red Spinner, with water-color sketch of original.

d. Water-cricket, with water-color sketch of original.

e. Great Dark Drone, with water-color sketch of original.

f. Cow-dung.

Body—Yellow mohair mixed with a little dingy brown fur from the bear. Wings—From the quill-feather of the curlew or whimbrel. Legs—Of a ginger-colored cock's hackle. For Pennsylvania, hooks Nos. 8 to 10; for New York, hook No. 8; for New England, hook No. 6.

g. Red Fly, with water-color sketch of original.

Body—The red part of squirrel's fur mixed with an equal quantity of claret mohair. Wings—The softest quill-feather of the pea-hen's wing. Legs—Claret-colored hackle; clip some of the upper fibers off that the wings may lie flat. For Pennsylvania, hook No. 6; for New York, hook No. 4; for New England, hook No. 3.

h. Blue Dun, with water-color sketch of original.

Body—Fur of a gray squirrel spun very thinly on fine yellow silk. Tail—Two fibers of a dun hackle. Wings—From a quill-feather of the blue-jay. Legs—Two or three turns of a ginger-dun hackle at the shoulder helps to keep the wings upright. For Pennsylvania, hook No. 6; for New York, hook No. 5; for New England, hook No. 4.

Hooks (including a full series of unmounted hooks, of recent and aboriginal manufacture).

32737. Artificial flies for salmon, trout, and bass—Continued.

i. Red Spinner, with water-color sketch of original.

Body—Bright brown silk ribbed, with fine gold twist. Tail—Two fibers of red cock's hackle. Wings—Upright from a mottled gray feather of the mallard stained a pale blue, the brighter in color the better. Legs—Plain red cock's hackle. For Pennsylvania, hook No. 6; for New York, hook No. 5; for New England, hook No. 4.

j. Nicholson.
k. Black Dog.
l. Atkinson.
m. Policeman.
n. Claret Wasp.
o. Blue Wasp.
p. Wren-tail, with water-color sketch of original.

Body—Ginger-colored fur ribbed with gold twist. Wings—Feathers from a wren's tail; if these cannot be procured a small scapular feather of the woodcock makes a good imitation, and may be hackled with the same kind of feather. For Pennsylvania, hook No. 10; for New York, hook No. 8; for New England, hook No. 6.

q. Red Ant, with water-color sketch of original.

Body—Peacock's herl tied with red-brown silk. Wings—From the quill-feather of the blue-jay. Legs—A small red cock's hackle.

r. Silver Horns, with water-color sketch of original.
s. Golden-dun Midge, with water-color sketch of original.
t. Sand-fly, with water-color sketch of original.

Body—Of the sandy-colored fur from the rabbit's neck or from the fox-squirrel spun on silk of the same color. Wings—From the whimbrel wing made full. Legs—From a light-ginger feather from the neck of a hen. For Pennsylvania, hooks Nos. 6 to 8; for New York, hooks Nos. 5 and 6; for New England, hooks Nos. 4 and 5.

u. Stone-fly, with water-color sketch of original.

Body—Fur of the gray squirrel, when it is shortest is best, mixed with a little yellow mohair, leaving yellow about the tail. Tail—A strand or two of brown mottled feathers, say of mallard. Wings—From the soft inside feather of the pea-hen's wing. Legs—Blue-dun cock's hackle. For Pennsylvania, hooks Nos. 6 to 8; for New York, hooks Nos. 5 and 6; for New England, hooks Nos. 4 and 5.

v. Gravel-bed, with water-color sketch of original.

Body—Dark dun or lead-colored silk floss dressed very fine. Wings—From a covert-feather of the woodcock's wing. Legs—A black cock's hackle, rather long, wound twice only round the body. For Pennsylvania, hooks Nos. 8 to 10; for New York, hooks Nos. 6 to 8; for New England, hooks Nos. 5 and 6.

Hooks (including a full series of unmounted hooks, of recent and aboriginal manufacture).

32737. Artificial flies for salmon, trout, and bass—Continued.

w. Grannum, with water-color sketch of original.

Body—Fur of a rabbit's face with a little fine green mohair worked in at the tail. Wings—From the inside wing-feather of a grouse. Legs—A pale ginger hen's hackle. For Pennsylvania, hooks Nos. 8 to 10; for New York, hooks Nos. 6 to 8; for New England, hooks Nos. 5 and 6.

x. Yellow Dun, with water-color sketch of original.

Body—Yellow mohair mixed with a little pale blue from a mouse or yellow floss silk with the least blue rabbit fur spun upon it. Wings—Upright, from the inside wing-feather of a mallard or summer duck. For Pennsylvania, hook No. 10; for New York, hook No. 8; for New England, hooks Nos. 5 and 6.

y. Iron-blue Dun, with water-color sketch of original.

z. Hawthorn, with water-color sketch of original.

Body—Black ostrich's herl. Wings—From the quill-feather of the English snipe. Legs—A black cock's hackle. For Pennsylvania, hooks Nos. 8 to 10; for New York, hooks Nos. 6 to 8; for New England, hooks Nos. 5 and 6.

aa. Jenny Spinner, with water-color sketch of original.

ab. Dennison.

Body—Green floss silk ribbed with silver twist. Tail—Orange-tipped fibres of tippet, wood-duck, ibis, and green parrot. Legs—A golden yellow hackle. Wings—Of the following kinds: wood-duck, tippet, brown mallard, bustard, green parrot, blue and yellow macaw, with a few strands of red macaw; black ostrich head. Hooks Nos. 1, 2, and 3.

ac. Deacon.

Body—Bright yellow seal's fur ribbed with silver tinsel backed with gold twist. Tail—Sprigs of gray mallard and ibis. Legs—Bright yellow hackle. Wings—Strips of gray mallard dressed full; black ostrich head. Hooks Nos. 2 and 3.

ad. Montreal.

Body—Claret mohair ribbed with gold tinsel. Tail—Three of four fibres of scarlet ibis. Legs—Claret hackle. Wings—Brown turkey. Hooks Nos. 1, 2, and 3.

ae. Rangely.

Body—Dark claret mohair ribbed with gold tinsel. Tail—Fibres of wood-duck and ibis. Legs—Dark claret hackle. Wing—Strips of wood-duck mixed with sprigs of scarlet ibis. Hooks Nos. 1, 2, and 3.

af. Tinselled Ibis.

Body—Silver tinsel ribbed with gold twist. Tail—A slip of wood-duck mixed with ibis. Legs—A covert wing-feather of the ibis. Wings—Strips from the large covert-feather of the ibis (the wing may be varied, adding a slip of wood-duck on each side); black ostrich head. Hooks Nos. 1, 2, and 3.

Hooks (including a full series of unmounted hooks, of recent and aboriginal manufacture).

32737. Artificial flies for salmon, trout, and bass—Continued.

ag. Lake George.

Body—Gold twist ribbed with silver twist. Tail—A small China topping. Legs—A bright orange hackle with a shoulder of bright claret. Wings—Two tippet feathers mixed with argus pheasant, brown mallard; black ostrich head. Hooks Nos. 1, 2, and 3.

ah. Chateaugay.

Body—Lemon-yellow floss ribbed with gold twist. Tail—A few fibres of brown mallard. Legs—A ginger-colored cock's hackle. Wings—Strips of shoveller duck mixed with fibres of argus pheasant.

ai. Yellow Drake.

Body—Yellow mohair ribbed with silver twist. Tail—Three fibres of yellow macaw. Legs—Yellow hackle with two turns of ibis on shoulder. Wings—Strips of gray mallard; black ostrich head. Hook No. 3.

aj. Richardson.

Body—A light-blue floss silk ribbed with silver twist. Tail—Three strands of brown mallard. Legs—Black cock's hackle. Wings—Strips of English blue-jay mixed with brown mallard. Hooks Nos. 3 and 4.

ak. Anthony.
al. Snow-fly.
am. Captain.
an. Combination.

Body—First half, yellow seal's fur; second half, red-claret seal ribbed with silver tinsel (the fur to be picked out). Tail—A few fibres of gray mallard mixed with ibis. Legs—A natural red hackle dipped in yellow dye. Wings—A piece of the same kind of hackle with pale ibis strips. On each side a piece of gray mallard sufficiently large to make the wing full; black ostrich head. Hooks Nos. 1, 2, and 3.

ao. Silver Doctor.

Body—Silver tinsel ribbed with gold twist. Tail—China pheasant topping. Legs—A pale-blue hackle with a small teal or guinea-hen at the shoulder. Wings—Mixed fibres of wood-duck, brown mallard, guinea-hen, green parrot, blue macaw, teal, and bustard; black ostrich head. Hooks Nos. 2 and 3.

ap. Prouty.

Body—First joint, silver twist; second, black ostrich with three turns of the twist over it. Tail—Orange floss with a turn or two of twist, a topping mixed with fibres of English blue-jay. Legs—A yellow dyed list hackle wound over the ostrich. Wings—Strips of white swan dyed yellow. One each side a rib of teal-feather, red macaw feelers; black ostrich head. Hooks Nos. 2 and 3.

aq. Black Cricket.
ar. Grasshopper.

Hooks (including a full series of unmounted hooks, of recent and aboriginal manufacture).

32737. Artificial flies for salmon, trout, and bass—Continued.

as. Great Blow.
at. Cadis.
au. Murray.

Black silk floss ribbed with silver twist. Tail—A small feather from the neck of the scarlet ibis. Legs—A golden yellow hackle. Wings—Dark mottled turkey; black ostrich head. Hooks Nos. 1 and 2.

av. Round Lake.
aw. Nameless.

Body—Brown ostrich herl, ribbed with gold twist, tag orange floss. Tail—Two or three short sprigs of yellow macaw. Legs—A small sooty orange hackle, wound from tag to shoulder. Wings—Alternate strips of brown peacock-wing feather and shoveller duck, with a sprig or two of wood-duck; peacock herl head. Hooks Nos. 1, 2, and 3.

ax. Racquette.

Is made in two joints of black orange mohair with gold tinsel. Legs—A dyed black hackle wound from tail to head. Tail—Bright yellow toucan. Wings—A mixture of gold pheasant tail, argus, and teal. Hooks Nos. 1, 2, and 3.

ay. Priest.
az. Francis Sykes.
ba. Duke.
bb. Dhoon.
bc. Dustin.
bd. Lascelles.
be. Snitching Sandy.
bf. Prouty.
bg. Grace.
bh. Powells.
bi. Hawthorne.
bj. Edmonson.
bk. Whitcher.
bl. Carshalton.
bm. Professor.

Body—Yellow mohair or silk floss ribbed with silver twist or tinsel. Tail—Two or three strands of scarlet ibis-wing feathers. Wings—From the gray.

bn. Coughton.
bo. Alder.
bp. Channtry.
bq. Kingdom.
br. Hoflan Fancy.
bs. Coachman.

Body—Peacock's herl. Wings—From a white hen's wing-feather, or a pigeon-wing feather will answer the purpose. Legs—A red cock's hackle wound twice or thrice at the shoulder. For Pennsylvania, hooks Nos. 8 to 10; for New York, hooks Nos. 5 and 6; for New England, hooks Nos. 4 and 5.

Hooks (including a full series of unmounted hooks, of recent and aboriginal manufacture).

32737. Artificial flies for salmon, trout, and bass—Continued.

bt. Willow.
bu. Prouty.
bv. Notion.

Body—First half gold twist, remainder brown mohair, with three turns of the twist over it. Tail—A topping mixed with blue kingfisher. Legs—Brown hackle. Wings—Two tippet feathers mixed with argus pheasant, brown mallard, teal, China pheasant-tail feathers, blue and yellow macaw, with a blue kingfisher on each side of the wing; black ostrich head. Hooks Nos. 2 and 3.

bw. Louise.

Body—Brown mohair ribbed with gold twist. Tail—China feather topping. Legs—Reddish brown hackle, blue-jay on shoulder. Wings—Pheasant tippet feather and tail mixed with sprigs of green parrot, blue macaw, and kingfisher. Head—Orange mohair. Hooks Nos. 1 and 2.

bx. Round Lake.

Body—Orange and red claret merging into each other, silver tinselled. Tail—Sprigs of gold pheasant tippet, blue macaw, and green parrakeet. Legs—A claret hackle with a turn or two of orange on the shoulder. Wings—Two strips of brown turkey, with a small jungle-cock's feather on each side. Hooks Nos. 1, 2, and 3.

by. Nicholson.
bz. Our Pattern.
ca. Saranac.

Body—Claret floss silk ribbed with gold tinsel, backed with silver twist. Tail—China pheasant crest-feather. Legs—A claret hackle. Wings—Two China pheasant tippet feathers on either side, a strip or two of brown mallard and argus pheasant; black ostrich head. Hooks Nos. 1–0, 2, and 3.

cb. Long Tom of Long Lake.

Body—Gray squirrel mixed with a little green mohair ribbed with silver tinsel. Tail—China pheasant crest-feather. Legs—A blue dun cock's hackle; at shoulder two or three turns of bright claret hackle. Wings—Strips of brown mallard mixed with strands of summer duck, peacock-wing, and upper coverts of the wild turkey, red macaw feelers; black plush head. Hooks Nos. 1, 2, and 3.

cc. St. Regis.

Body—Cinnamon mohair ribbed with double gold twist. Tail—A strip of China pheasant tippet mixed with a few strands of bustard. Legs—A chestnut hackle with three turns or so of orange-dyed guinea-hen, small and short in the fibres. Wings—Strips of brown mallard, brown turkey, English pheasant tail, and China tippet; black ostrich head. Hooks Nos. 1 and 2.

Hooks (including a full series of unmounted hooks, of recent and aboriginal manufacture).

32737. Artificial flies for salmon, trout, and bass—Continued.

cd. No. 8.

Body—Three or four turns of mohair, rest of black mohair ribbed with silver tinsel and backed with gold twist. Tail—A small topping. Legs—A dyed black hackle and a shoulder of red claret. Wings—Mixed fibres of mallard, guinea-hen tail-feather over wing, two strips of dark turkey tipped with white. Hooks Nos. 2 and 3.

ce. Highlander.

cf. Lady of Mertoun.

Body—Water-rats fur ribbed with silver twist. Tail—A tip of common ostrich or mohair and a gold pheasant topping. Legs—Two or three turns of a small red hackle finished off with a black hackle. Wings—Strips of dark gray mallard. Head—Crimson ostrich or mohair. Hooks Nos. 1-0, 1, and 2.

cg. Toppy.

Body—Black mohair ribbed with silver tinsel. Tail—A topping tip crimson. Legs—A turn or two of red hackle, the rest black hackle. Wings—Black or brown turkey tipped with white. Head—Crimson. Hooks Nos. 1-0, 1, and 2.

ch. Sapper.

Body—Orange mohair ribbed with gold tinsel. Tail—Fibres of green parrot, guinea-hen, tippet feather, and ibis. Legs—Orange hackle, shoulder a dyed black hackle. Wings—Strips of peacock-wing feather, brown mallard, green parrot, guinea-hen, gold pheasant tail, blue macaw feelers; black ostrich head. Hooks Nos. 1-0 and 1.

ci. Stephens.

Body—Brick-colored, silk ribbed with gold twist and blue tip. Tail—Gold pheasant topping. Legs—Hackle, same color as body. Wings—Gold pheasant tippet and slight mixture of mallard; black ostrich head. Hooks No. 1.

cj. Jock Scott.

Body—In two joints, gold-colored floss the lowest, and black floss the upper; from the joint are tied two short toucan points, and over the butts of them at the joints two turns of black ostrich. Tail—One gold pheasant topping and one Indian crow feather. Legs—Black hackle over the black joint and speckled guinea-hen at the shoulder. Wings—A white tip turkey, slip in the middle fibres of bustard, teal, brown mallard, yellow, red, and green parrot, one topping over all; blue macaw feelers. A kingfisher on either cheek; black ostrich head. Hooks Nos. 1-0, 1, and 2.

ck. Whitcher.

Body—Black mohair ribbed with silver, tip yellow silk. Tail—Gold pheasant topping. Legs—Black hackle. Wings—A mixture of mallard and hooded merganser; black ostrich head. Hooks Nos. 1 and 2.

Hooks (including a full series of unmounted hooks, of recent and aboriginal manufacture).

32737. Artificial flies for salmon, trout, and bass—Continued.

ck. Nicholson.

Body—Blood-red mohair ribbed with gold tinsel. Tail—Sprigs of mallard and pheasant tippet feather. Legs—A blood-red and a dark-blue hackle wound on together. Wings—Brown mallard and blue macaw feelers; black ostrich head. Hooks Nos. 1 and 2.

cm. Caribou.

Body—Tip gold tinsel, tag golden-yellow silk, next a black silk joint, the rest of gray caribou. Legs—Gray hackle with a claret on the shoulder. Tail—Gold pheasant topping. Wings—Turkey and mallard with sprigs of macaw and pheasant tippet feather; black ostrich head. Hooks Nos. 1-0, and 1.

cn. Moose.

Body—Yellow floss ribbed with silver tinsel. Tail—A China pheasant topping. Legs—A yellow hackle; shoulder hackle a guinea-hen. Wings—Two tippet feathers of the China pheasant with fibres of mallard wood-duck on each side; black ostrich head. Hooks Nos. 1, 2, and 3.

co. Moosehead.

Body—Deep claret mohair ribbed with gold twist. Tail—A topping. Legs—A claret hackle with three turns of orange hackle at the shoulder. Wings—Strips of brown mallard and tippet feather with red macaw feelers; black ostrich head. Hooks Nos. 1, 2, and 3.

cp. Fiery-brown.

Body—Fiery brown mohair ribbed with gold tinsel. Tail—A small topping mixed with wood-duck. Legs—A brown-red hackle. Wings—Brown mallard with a little wood-duck and golden pheasant neck-feather mixed; black head. Hooks Nos. 1, 2, and 3.

cq. Parson.
cr. Gold Wing.
cs. Gold Mallard.
ct. Kircudbrightshire.
cu. Eagle.
cv. Tartan.
cw. Last Fly.
cx. Atkinson.
cy. Strachan.
cz. Parson.

Body—Black mohair tipped with orange and ribbed with silver twist. Tail—A small topping. Legs—A black hackle. Wings—Brown turkey-tail; black head. Hooks Nos. 2 and 3.

da. Ross.

Body—Cinnamon-colored floss ribbed with gold twist. Tail—Sprigs of green parrot. Legs—A furnace hackle. Wings—Brown mallard mixed with peacock herl; black ostrich head. Hooks Nos. 1-0 and 1.

Hooks (including a full series of unmounted hooks, of recent and aboriginal manufacture).

32737. Artificial flies for salmon, trout, and bass—Continued.

db. Forsyth.
dc. Chamberlin.
dd. Green.
de. Whitcher.
df. Langrin.
dg. Emmet.
dh. Captain.
di. Major.
dj. Darling.
dk. Durham Ranger.
dl. Goldfinch.
dm. Britannia.
dn. Popham.
do. White Tip.
dp. White Wing.
dq. Drake Wing.
dr. Dun Wing.
ds. Black and Yellow.
dt. Blue Doctor.
du. Kate.
dv. Ruggles.
dw. Little yellow May Dun, with water-color sketch of original.
dx. Oak Fly, with water-color sketch of original.

Body—Orange floss silk ribbed with ash-colored silk thread or a little floss, the ash-color to be shown well at the tail and shoulders. Wings—From a scapular feather of the woodcock. Legs—A furnace hackle or red cock's hackle with a black list up the middle. For Pennsylvania, hooks Nos. 8 to 10; for New York, hooks Nos. 6 to 8; for New England, hooks Nos. 5 and 6.

dy. Black Gnat, with water-color sketch of original.

Body—Black ostrich herl. Wings—From the quill-feather of the rice-bird or grakle. Legs—Black hackle. For Pennsylvania, hooks Nos. 10 to 12; for New York, hooks Nos. 8 to 10; for New England, hook No. 8.

dz. Fern Fly, with water-color sketch of original.

Body—Orange floss silk. Wings—From the quill-feather of the summer-duck wing; the smaller-sized hooks can be dressed from the wing-feather of the blue-jay. Legs—A red cock's hackle. For Pennsylvania, hooks Nos. 8 to 10; for New York, hooks Nos. 6 to 8; for New England, hooks Nos. 5 and 6.

ea. Yellow Sally, with water-color sketch of original.

Body—Any yellowish fur ribbed with yellow or apple-green silk. Wings—From a wing-feather of a white hen or white pigeon stained pale yellow. Legs—A white cock's hackle stained in the same dye. For Pennsylvania, hooks Nos. 6 to 8; for New York, hooks Nos. 5 and 6; for New England, hooks Nos. 4 and 5.

Hooks (including a full series of unmounted hooks, of recent and aboriginal manufacture).

32737. Artificial flies for salmon, trout, and bass—Continued.

eb. Alder Fly, with water-color sketch of original.

Body—Peacock's herl. Wings—From a feather of a brown hen's wing. Legs—A red cock's hackle or a black cock's hackle will answer tolerably well. For Pennsylvania, hooks Nos. 8 to 10; for New York, hooks Nos. 5 and 6; for New England, hooks Nos. 4 and 5.

ec. Sky Blue, with water-color sketch of original.

ed. Little dark Spinner, with water-color sketch of original.

ee. Turkey Brown, with water-color sketch of original.

ef. Magalloway.

Body—Half black ostrich and half brown mohair ribbed with gold twist. Tail—Short fibers of yellow macaw. Legs—A furnace hackle of the shoulder. Wings—Strips of brown quill-feathers of the peacock; black ostrich head. Hook No. 3.

eg. Bemis Stream.

Body—Chestnut mohair ribbed with gold tinsel. Tail—China pheasant topping. Legs—A chestnut hackle. Wings—Strips of brown peacock mixed with bustard. Hooks Nos. 1 and 2.

eh. Mooselocmaguntick.

Body—About equal parts mixed of gray squirrel's fur and pea-green mohair ribbed with gold twist. Tail—Four strands of argus feathers. Legs—A brown bittern hackle. Wings—Gray speckled turkey, white tipped (dye yellow), with a strip of argus feather on each side; green ostrich head. Hook No. 1.

ei. Molechunkemunk.

Body—Orange floss silk ribbed with gold tinsel, backed with silver twist. Tail—China pheasant topping. Legs—A furnace hackle. Wings—Brown mallard; black ostrich head.

ej. Willow Finch.

Body—Yellow seal's fur ribbed with silver twist. Tail—Sprigs of tippet feathers mixed with yellow macaw. Legs—A yellow hackle, at the shoulder a small guinea-hen stained yellow. Wings—Strips of swan feather dyed yellow with a spray of guinea-hen (tail-feather) dyed yellow; black ostrich head. Hooks Nos. 1, 2, and 3.

ek. Oquassac.

Body—Red claret mohair ribbed with pink floss. Tail—Yellow tag with pieces of argus and tippet feathers. Legs—A claret hackle. Wings—Strips from the quill-feather of the argus pheasant; black ostrich head. Hooks Nos. 1-0 and 1.

el. Welokennebago.

Body—Red pig's hair ribbed with broad gold tinsel, backed with silver twist. Tail—A mixture of black turkey tipped with white and scarlet ibis. Legs—Scarlet hackle. Wings—Fibers of red macaw mixed with strips of black and brown turkey tipped with white; black ostrich head.

Hooks (including a full series of unmounted hooks, of recent and aboriginal manufacture).

32737. Artificial flies for trout, salmon, and bass—Continued.

em. Capsuptuc.

Body—Silver tinsel ribbed with gold twist. Tail—Fibers of China pheasant tail mixed with guinea-hen and red macaw. Legs—A brilliant scarlet hackle. Wings—Mixed and to be made full. Two strips of brown turkey tipped with white-brown mallard, China pheasant tail and guinea-hen; black ostrich head. Hooks Nos. 1–0, 1, and 2.

en. Orange Grouse.
eo. Thunder and Lightning.
ep. Lough Gill.
eq. Lillie.
er. Black Ant.
es. Blue Blow.
et. Mare.
eu. Hare's Ear.
ev. Ibis.
ew. Seth Green.
ex. Red Creeper.
ey. Turkey Brown.
ez. Queen of the Waters.
fa. Governor.
fb. White Miller.
fc. Lion.
fd. Water-witch.
fe. Atkinson.
ff. Our Own Pattern.
fg. Green Drake, with water-color sketch of original.

Body—Pale straw-colored floss silk ribbed with brown silk thread or floss; the extremities are of brown peacock's herl. Tail—Three rabbit's whiskers. Wings—Made from a mottled feather of mallard stained a pale yellowish-green. Legs—A grizzled cock's hackle stained a yellowish-green in the same dye. For Pennsylvania, hooks Nos. 6 to 8; for New York, hooks Nos. 4 to 6; for New England, hooks Nos. 3 and 4.

fh. Gray Drake, with water-color sketch of original.

Body—The middle part of white floss silk ribbed with silver twist; the extremities of brown peacock's herl. Tail—Three rabbit's whiskers. Wings—Made from a gray mottled feather of the mallard. Size of hooks same as green drake.

fi. Orange Dun, with water-color sketch of original.

This fly is equally attractive to trout, and is a prime favorite in its day—the end of June, July, and August. Body—Dark orange silk. Tail—Two fibers of brown mallard feather. Wings—From the quill-feather of the large red-crowned woodpecker. For Pennsylvania, hooks Nos. 6 to 8; for New York, hook No. 6; for New England, hooks Nos. 5 and 6.

fj. Green Mackerel, with water-color sketch of original.
fk. Brown Mackerel, with water-color sketch of original.
fl. Marlow Buzz, with water-color sketch of original.

Hooks (including a full series of unmounted hooks, of recent and aboriginal manufacture).

32737. Artificial flies for trout, salmon, and bass—Continued.

fm. Pale Evening Dun, with water-color sketch of original.

fn. July Dun, with water-color sketch of original.

Body—Mole's fur and pale-yellow mohair mixed and spun on yellow silk. Tail—Two or three whiskers of a dark dun hackle. Wings—From the quill-feather of a blue-jay. Legs—Dark dun hackle. For Pennsylvania, hooks Nos. 8 to 10; for New York, hooks Nos. 6 to 8; for New England, hooks Nos. 5 and 6.

fo. Gold-eyed Gauge-wing, with water-color sketch of original.

fp. Butcher, No. 1.

fq. Blue Ranger.

fr. Black Ranger.

fs. Colonel.

ft. Children's Farlow.

fu. Candlestick Maker.

fv. Baker.

fw. Butcher.

fx. Namsen.

fy. Black and Teal.

fz. Guinea Hen.

ga. Claret.

gb. Inquichin.

gc. Maxwell Ranger.

gd. August Dun, with water-color sketch of original.

Body—Brown floss silk ribbed with yellow silk thread. Tail—Two rabbit's whiskers. Wings—Feather of a brown hen's wing. Legs—A dark red hackle. For Pennsylvania, hook No. 8; for New York, hook No. 6; for New England, hook No. 5.

ge. Orange, with water-color sketch of original.

Body—Orange floss silk ribbed with black silk. Wings—Dark part of the blue-jay's wing. Legs—A very dark furnace hackle. For Pennsylvania, hooks Nos. 8 to 10; for New York, hooks Nos. 6 to 8; for New England, hook No. 6.

gf. Cinnamon, with water-color sketch of original.

Body—Fawn-colored floss silk ribbed with red silk thread. Wings—Feather of a yellow-brown hen's wing. Legs—A ginger hackle. For Pennsylvania, hook No. 8; for New York, hook No. 6; for New England, hook No. 6.

gg. Blue-bottle, with water-color sketch of original.

Body—Bright blue floss silk with a few turns of brown floss at the shoulder. Wings—From the quill-feather of a water-hen. Legs—Black hackle from a cock wrapped down the principal part of the body. For Pennsylvania, hook No. 8; for New York, hook No. 6; for New England, hook No. 5.

gh. Whirling-blue Dun, with water-color sketch of original.

Body—Squirrel's red-brown fur mixed with yellow mohair. Tail—One or two whisks of a pale ginger hackle. Wings—From the quill-feather of a mallard. For Pennsylvania, hook No. 8; for New York, hook No. 8; for New England, hook No. 6.

Hooks (including a full series of unmounted hooks, of recent and aboriginal manufacture).

32737. Artificial flies for trout, salmon, and bass—Continued.

gi. Willow, with water-color sketch of original.

Body—Mole's fur mixed with a little fine yellow mohair. Wings—From the quill-feather of a water-hen or coot. Legs—A dark dun hen's hackle. For Pennsylvania, hooks Nos. 8 to 10; for New York, hook No. 8; for New England, hooks Nos. 5 and 6.

gj. Snowy.
gk. Beauty Snow.
gl. Red Palmer, with water-color sketch of original.

Body—Red mohair ribbed with gold twist or tinsel. Legs—A blood-red cock's (saddle) hackle wrapped nicely over it, working the hackle closely together at the shoulder. For Pennsylvania, hooks Nos. 6, 8, and 10; for New York, hooks Nos. 4, 5, and 6; for New England, hooks Nos. 3, 4, and 5.

gm. Black and Red Palmer, with water-color sketch of original.
gn. Brown Palmer, with water-color sketch of original.
go. Furnace.
gp. Grizzle.
gq. Ginger.
gr. List.
gs. Soldier.
gt. White.
gu. Grizzle Peacock.
gv. Red.
gw. Black Peacock.
gx. Black.
gy. Brown Peacock.
gz. Scarlet.

25548. Salmon fly-book for carrying artificial flies.
25547. Trout fly-book for carrying artificial flies. Loaned by Bradford & Anthony, Boston, Mass. ($4.50.)
26677. Fly-book. Forest & Stream Publishing Company. Property of J. A. [Nichols, Syracuse, N. Y.
26678. Fly-book. " "
26679. Fly-book. " "

Lines (twisted and plaited).

Silk lines.

25633. Series of braided raw-silk lines. (50 yards; C to G.) G. H. Mansfield & Co., Canton, Mass.
25632. Oiled, braided, raw-silk lines. G. H. Mansfield & Co., Canton, Mass.
25628. XXXX silk fish-line. (50 yards.) "
25629. XX silk fish-line. (50 yards.) "
25634. Grass lines. Nos. 0, 1, and 3 cable, and 3 shroud. Bradford & Anthony, Boston, Mass.
25635. Braided grass lines. Bradford & Anthony, Boston, Mass.

s (twisted and plaited).

inen lines.

25626. Hard-braid linen lines. (1 to 5; 50 yards each.) G. H. Mansfield & Co., Canton, Mass.
25631. Series of braided linen fish-lines. (50 yards.) G. H. Mansfield & Co., Canton, Mass.
25612. Linen fish-lines. J. & S. Allen, Walpole, Mass.
25613. Linen fish-lines. "
25618. Linen fish-lines. "
25637. Linen bass-line. (600 feet.) Bradford & Anthony, Boston, Mass.

otton lines.

25619. Cotton fish-lines. (20 feet hank.) L. Crandall & Co., Ashaway, R. I.
25620. Cotton fish-lines. (50 feet shroud, laid.) "
25621. Cotton fish-lines. (28-fathom hawser.) "
25622. Cotton fish-lines. (14-fathom hawser.) "
26738. Fishing-line, No. 3. (Sea-Island fly-line.) J. W. Dresser, Castine, Me.
26733. Fishing-line, No. 5. " "
26743. Fishing-line, No. 5. (Golden mackerel, oiled.) " "
26741. Fishing-line, No. 6. (Golden mackerel, oiled.) " "
26735. Fishing-line, No. 6. " "
26744. Fishing-line, No. 7. (Golden mackerel, white.) " "
26739. Fishing-line, No. 7. (White.) " "
26742. Fishing-line, No. 8. (Golden mackerel, oiled.) " "
26740. Fishing-line, No. 9. (Golden mackerel, oiled.) " "
26734. Fishing-line, No. 9. " "
26745. Fishing-lines, No. 7, 8, and 9. (Sea-side cotton chalk-line, white.) J. W. Dresser, Castine, Me.
26736. Fishing-line, No. 10. (14 fathoms, hawser-laid.) J. W. Dresser, Castine, Me.
26732. Fishing-line, No. 11. (Bluefish.) (24 fathoms long, hawser-laid.) J. W. Dresser, Castine, Me.
25624. Tarred cotton fishing-lines. (25-fathom shroud.) L. Crandall & Co., Ashaway, R. I.
25623. Cotton fishing-lines. (50 feet shroud, laid.) L. Crandall & Co., Ashaway, R. I.
26016. Golden mackerel lines of assorted sizes. Made from pure Sea-Island cotton. J. W. Dresser, Castine, Me.
25625. Braided cotton fishing-lines. G. H. Mansfield & Co., Canton, Mass.
25636. Sea-Island cotton mackerel-lines. Bradford & Anthony, Boston, Mass.
25627. Water-proof braided fish-lines. (B to G.) G. H. Mansfield & Co., Canton, Mass.
660. Fishing-line. Northwest coast of America. G. Gibbs.

Whalebone lines.

2193. Whalebone fish-line. Anderson River Indians. Anderson River. R. MacFarlane.
2197. Whalebone line with hooks. Eskimo. Anderson River. R. MacFarlane.
2016. Whalebone line. Arctic coast. B. R. Ross.

Lines (twisted and plaited).

Hide lines.

8787. Fishing-line made of seal-skin. Mahlemut Eskimo. W. H. Dall.
8785. Fishing-line made of seal-skin. Kaviakemut Eskimo. Grantley Harbor, Alaska. W. H. Dall.
8786. Fishing-line made of seal-skin. Unalcet Eskimo. St. Michael's, Alaska. W. H. Dall.
16314. Harpoon-line. Nunivak Island, Alaska. W. H. Dall.
15617. Harpoon-line. Made of skin of young walrus. Alaska. H. W. Elliott.
19376. Harpoon-line made of seal-skin. Rev. James Curly.

Bark lines.

20655. Fishing-line made of cedar bark. Bella Bella, B. C. J. G. Swan.
20888. Fishing-line made of spruce root-fibers. Hannegan Indians. Prince of Wales Islands, Alaska. J. G. Swan.
20821. Harpoon-line, cedar bark. Makah Indians. J. G. Swan.

Kelp lines.

656. Fishing-lines of sea-weed. (*Nereocystis lutkeana.*) Northwest coast of America. G. Gibbs..
6561. Fish-line of kelp. (*Nereocystis lutkeana.*) With halibut-hooks. Haidah Indians. Prince of Wales Archipelago. Dr. T. T. Minor.
1052. Fish-line. (*Nereocystis lutkeana.*) Northwest coast. Lieut. J. W. White.
26818. Halibut-line of kelp. (*Nereocystis lutkeana.*) Makah Indians. Neah Bay, W. T. J. G. Swan.
26819. Fish-line of kelp with halibut-hooks. Clyoquot Indians. Vancouver's Island. J. G. Swan.

(ACCESSORY.) APPARATUS FOR TWISTING LINES

Snoods, leaders, and traces.

"Cat-gut" (sheep) snoods and leaders.
Silkworm-gut snoods.
Flax snoods.
Gimp snoods.
Wire snoods.
Hooks mounted on leaders.

25540. Kinsey trout-hooks. (Tied to gut.) Bradford & Anthony, Boston, Mass.
25542. Aberdeen hooks. (Tied to gut.) Bradford & Anthony, Boston, Mass.
25543. Hollow-point Limerick hooks. (Tied to double gut.) Bradford & Anthony, Boston, Mass.
25544. Hollow-point Limerick hooks. (Tied to twisted gut.) Bradford & Anthony, Boston, Mass.
25545. Hollow-point Limerick hooks. (Tied to gimp.) Bradford & Anthony, Boston, Mass.
25546. Carlisle hooks. (Tied to gimp.) Bradford & Anthony, Boston, Mass.
25539. Hollow-point Limerick trout-hooks. (Tied to gut.) Bradford & Anthony, Boston, Mass.
25541. New York bass-hooks. (Tied to gut.) Bradford & Anthony, Boston, Mass.

Sinkers.

Sinkers and swivels.

——. Sinkers and swivels. For fishing-lines. Bradford & Anthony, Boston, Mass.

25605. Series of sinkers used in fishing for cod and tautog. Newport models. J. M. K. Southwick, Newport, R. I.

25607. Hand-line sinkers. Rhode Island and Eastern Connecticut. A. R. Crittenden.

25716. Cod-line sinker. Central Wharf Company, Provincetown, Mass.

29456. Cod-lead mold. Used to make form in molding. John B. Parsons, Rockport, Mass.

15591. Sinker made of walrus ivory. Pornoox Eskimos, Alaska. H. W. Elliott.

Net-sinkers.

——. Net-sinkers. Wilcox, Crittenden & Co., Middletown, Conn.

29393. Net-rings or sinkers. Wilcox, Crittenden & Co., Middletown, Conn.

29474. Primitive net-sinkers. Used in Wellfleet, Mass. Newell B. Rich, Wellfleet, Mass.

25800. Menhaden-net sinkers (old style). Formerly used about Beverly and Salem, Mass. George B. Foster, Beverly, Mass.

25603. Seine-sinkers. Newport model. J. M. K. Southwick, Newport, R. I.

Spreaders.

Chopsticks.

One-armed chopsticks or "revolving booms."

Floats.

Line-floats of wood, cork, and quill.

25661. Egg-shaped floats. Wm. M. Young, Philadelphia, Penn.

25662. Barrel-shaped floats. " "

25663. Snake-head floats. " "

25664. Quill floats. " "

Seine-floats of cork, wood, glass, and rubber tubing.

25597. Seine-corks. Used at Newport, R. I. J. M. K. Southwick, Newport, R. I.

Harpoon-floats of bladder, inflated skin, and wood.

20898. Seal-skin buoy. Sitka Alaska. J. G. Swan.

1035. Seal-skin buoy. Makah Indians. Puget Sound. J. G. Swan.

19515. Seal-skin buoy. North Greenland. G. Y. Nickerson.

26824. Seal-skin buoy. (Used in whale fisheries.) Clyoquot Indians, Vancouver's Island. J. G. Swan.

26823. Seal-skin buoy. (Used in whale fisheries.) Clyoquot Indians, Vancouver's Island. J. G. Swan.

20594. Seal's bladder buoy. Bella Bella, B. C. J. G. Swan.

827, 4970. Seal-skin buoy with rope. Makah Indians. Neeah Bay, Puget Sound, W. T. J. G. Swan.

Keg and other floats for lobster-pots, gill-nets, &c.

Whale-line drag.

29. (ACCESSORY.) ANGLING-APPARATUS.

Reels.

Simple reels for fly-fishing, with and without check.

25590. Brass fishing-reel. Plain, single, with ring. Bradford & Anthony, Boston, Mass.
25589. Brass fishing-reel. Plain, single, with plate. Bradford & Anthony, Boston, Mass.
25587. Brass fishing-reel. Plain, single, with stop and ring. Bradford & Anthony, Boston, Mass.
25588. Brass fishing-reel. Plain, single, with stop and plate. Bradford & Anthony, Boston, Mass.
25577. Hard-rubber fishing-reel, German-silver band. Rim very narrow, with leather case. Bradford & Anthony, Boston, Mass.
25568. Hard-rubber salmon-fishing reel. German-silver rim. Bradford & Anthony, Boston, Mass.
25581. Rubber trout-reel. (Fowler's patent.) Bradford & Anthony, Boston, Mass.
25582. Orvis' patent fishing-reel. German silver, nickeled and perforated. Bradford & Anthony, Boston, Mass.
25567. Fine click brass fishing-reel. (25 yards.) Bradford & Anthony, Boston, Mass.
25586. Brass fishing-reel. Click, with plate. Bradford & Anthony, Boston, Mass.
25585. Brass fishing-reel. Click, with ring. Bradford & Anthony, Boston, Mass.
25575. German-silver trout-fishing reel. Click, with rim. Bradford & Anthony, Boston, Mass.
25565. German-silver trout click fishing-reel. (150 yards.) Bradford & Anthony, Boston, Mass.
25569. Hard-rubber trout-fishing reel. Click, German-silver rim.
25571. Hard-rubber trout-fishing reel. Click, plain rim. Bradford & Anthony, Boston, Mass.
25579. Celluloid trout click fishing-reel. Bradford & Anthony, Boston, Mass.
25560. German-silver trout click fishing-reel. (60 yards.) Bradford & Anthony, Boston, Mass.
25564. German-silver salmon-fishing reel, click. (4½ inch.) Bradford & Anthony, Boston, Mass.

Multiplying reels for bass-fishing, with and without check.

25580. Celluloid fishing-reel. Multiplying and click. Bradford & Anthony, Boston, Mass.
25583. Brass fishing-reel. Multiplying, stop and ring. Bradford & Anthony, Boston, Mass.
26688. Fowler reel. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.
26687. Fowler reel. " "
26686. Frankfort reel. " "
26689. Plain reel. " "
26916. Winans reel. J. Ross Winans, Baltimore, Md.
26663. Reel for trolling-line. Property of J. A Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.

Reels.

Multiplying reels for bass fishing, with or without check.

25574. German-silver fishing-reel. Multiplying; 25 yards. Bradford & Anthony, Boston, Mass.
25570. Hard rubber trout-fishing reel. Multiplying; 60 yards. Bradford & Anthony, Boston, Mass.
25584. Brass fishing-reel. Multiplying stop and plate. Bradford & Anthony, Boston, Mass.
25573. Brass fishing-reel. Multiplying drag; 60 yards. Bradford & Anthony, Boston, Mass.
25572. German-silver fishing-reel. Steel pivot, multiplying drag, 300 yards. Bradford & Anthony, Boston, Mass.
25578. Celluloid fishing-reel. With multiplying click and extra spool. Bradford & Anthony, Boston, Mass.

Gunwale-winches.

Trawl-line rollers.

29432. Trawl-roller or hauler. Provincetown style. Andrew Kennedy, Provincetown, Mass.
29434. Trawl-roller or hauler. Cape Ann style. Samuel Elwell, jr., Gloucester, Mass.
29488. Trawl-roller and eye-plate. First used by Provincetown fishermen. Amasa Taylor, Provincetown, Mass.
29445. Improved trawl-roller and socket. Amasa Taylor, Provincetown, Mass.
25767. Trawl-roller. Used to haul in trawls over the sides of dory. Allen L. McDonald, Gloucester, Mass.
——. Trawl-winch. Gloucester, Mass. G. Brown Goode.

Dredge-line rollers.

Seine-windlasses.

Line-holders.

Whaleman's line-tub.

88 F. C. Sounding-line reel. U. S. Fish Commission.
25009. Harpoon-line and tub. Used in whale-boat. J. H. Thomson, New Bedford, Mass.

Tub for trawl-line. (See under Trawl.)

Winders.

Spools.

25592. Crab-line reel. Used in Newport, R. I. J. M. K. Southwick, Newport, R. I.

Seine-reels.

Rods.

25511. Common rod. Three pieces; ash and hornbeam; brass mounting. Bradford & Anthony, Boston, Mass.

Rods.

25501. General fishing-rod. Nine pieces; German-silver mounting. Bradford & Anthony, Boston, Mass.

25500. General fishing-rod. Six pieces; ash and lancewood; German-silver mounting. Bradford & Anthony, Boston, Mass.

26890. Trunk-rod of greenheart; five-jointed, with extra fourth piece and tip, seven pieces in all; weight, 8 oz.; length, 11 feet 6 inches. Thaddeus Norris, Philadelphia, Pa.

25512. Gudgeon-rod. Three pieces; ash and hornbeam; brass mounting; common. Bradford & Anthony, Boston, Mass.

25510. Common pickerel-rod. Four pieces. Bradford & Anthony, Boston, Mass.

25509. Bait-rod for trout. Four pieces; common. Bradford & Anthony, Boston, Mass.

25513. Jointed rod. Four joints, extra tips, tie guides; made of Calcutta bamboo; full mounted in brass. Bradford & Anthony, Boston, Mass.

25508. Common bass-rod. Four pieces; brass mounted. Bradford & Anthony, Boston, Mass.

25498. Light bass-rod. Four pieces; extra top; ash and lancewood; German-silver mounting. Bradford & Anthony, Boston, Mass.

25497. Bass-rod. Four pieces and extra top for sea-fishing; ash and lancewood; German-silver mounting; jeweled tip. Bradford & Anthony, Boston, Mass.

25496. Sea-bass rod. Ash butt joint, bamboo middle joint, lancewood stock; double guides, jeweled; German-silver mounting; jeweled tips. Bradford & Anthony, Boston, Mass.

25499. Black-bass rod. Four pieces and two extra tops; split bamboo; German-silver mounting. Bradford & Anthony, Boston, Mass.

25502. Fly-rod. Three pieces and extra top; cedar and split bamboo. Bradford & Anthony, Boston, Mass.

25504. Fly-rod. Three pieces and extra top; extra middle joint; bamboo tip case; ash and lancewood; German-silver mounting. Bradford & Anthony, Boston, Mass.

25505. Fly-rod. Four pieces and extra top; ash and lancewood; German-silver mounting. Bradford & Anthony, Boston, Mass.

26887. Salmon-rod of greenheart, four-jointed in cedar case, with extra third piece and tip; weight, 30 oz.; length, 17 feet 3 inches. Thaddeus Norris, Philadelphia, Pa.

25503. Fly-rod for trout. Three pieces and extra top; split bamboo; German-silver mounting. Bradford & Anthony, Boston, Mass.

25506. Trout-rod. Four pieces and extra top; ash and lancewood; German-silver mounting; agate-lined tips. Bradford & Anthony, Boston, Mass.

25507. Salmon-rod. Four pieces and extra tops; bamboo top-case; ash and lancewood; German-silver mounting. Bradford & Anthony, Boston, Mass.

25887. The "Cold Brook," hollow, fly-rod. (Patented June 22, 1875.) J. L. Graves, Springfield, Mass.

25886. The "Cold Brook," hollow, salmon, bass, and angling rod. Nickel-plated, with reel showing an attached line working. (Patented June 22, 1875.) J. L. Graves, Springfield, Mass.

Rods.

The following are the advantages claimed by Mr. Graves for his new rods:

"1. The line is concealed and cannot be caught in underbrush or branches.
2. The strain on the rod is equalized through the entire length.
3. There is no friction through rings or guides except on the tip.
4. The strength of the rod is greatly increased.
5. The weight of the rod is diminished.
6. The wet line is not reeled up to decay.
7. The rod goes under the brush where the big trout lie.
8. It adds greatly to the comfort and pleasure of 'the gentle art.'"

26661. Plain fly-rod. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.

26662. Bait-rod. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.

26663. Bait-rod. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.

26712. English fly-rods. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.

26707. Rod-case. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.

25882. Split bamboo trout-rod. 11½ feet. H. L. Leonard, Bangor, Me.

26660. Split bamboo rod. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.

26888. Extra greenheart trout-rod; cedar case; three-jointed, with one extra middle and two extra tips, six pieces in all; weight, 8 oz.; length, 12 feet. Thaddeus Norris, Philadelphia, Pa.

26889. Rent and glued bamboo trout-rod in cedar case, with one extra middle and two extra tips, six pieces in all; weight, 8 oz.; length, 12 feet. Thaddeus Norris, Philadelphia, Pa.

26883. Plain trout-rod of greenheart; three-jointed, with extra middle and tip, five pieces; weight, 8 oz.; length, ——. Thaddeus Norris, Philadelphia, Pa.

25881. Split bamboo grilse-rod. 14 feet. H. L. Leonard, Bangor, Me.

25883. Split bamboo salmon-rod. 16 feet. " "

25884. Piece of bamboo. Showing spliting process in construction of rods. H. L. Leonard, Bangor, Me.

25885. Piece of bamboo. Showing gluing process in construction of rods. H. L. Leonard, Bangor, Me.

25491. Chapman's combination trolling-pole. Harpoon-line holder and cane. W. D. Chapman, Theresa, N. Y.

Swivels.

25798. Horn cod-line swivel. Much used in olden time by Grand and George's Banks fishermen. George B. Foster, Beverly, Mass.

25945. Cod-line swivel. Central Wharf Company, Gloucester, Mass.

26017. Cod-line gange-swivel. A. R. Crittenden, Middletown, Conn.

25944–6. Patent gange-swivel. Used in cod-fishing. Central Wharf Company, Gloucester, Mass.

29486. Cod-gange swivel. Showing mode of fastening. Lemuel Cook, 2d, Provincetown, Mass.

29487. Haddock-gange swivel. Showing mode of fastening. Lemuel Cook, 2d, Provincetown, Mass.

29392. Wood horse-swivel. Used on cod-line. Capt. E. L. Rowe, Gloucester, Mass.

Swivels.

25942. Halibut-gange. Showing mode of fastening on the hook. A. R. Crittenden.
29457. Shark-hook swivel. Wilcox, Crittenden & Co., Middletown, Conn.
29395. Primitive trawl-buoy swivels. George B. Foster, Beverly, Mass.
29476. Halibut trawl-buoy swivel. Used by the George's Banks fishermen. Amasa Taylor, Provincetown, Mass.
29498. Trawl-buoy swivels. Alex. McCurdy, East Gloucester, Mass.
25187. Trawl-buoy rope swivel. Wilcox, Crittenden & Co., Middletown, Conn.
25946. Trawl-buoy rope swivel. Central Wharf Company, Provincetown, Mass.

Clearing-rings.

Disgorgers.

29435. Trawl-sheave bushing. Samuel Elwell, jr., Gloucester, Mass.
——. Halibut "gob-stick." Philip Merchant, Gloucester, Mass.

V. NETS.

ENTANGLING-NETS.

Meshing-nets (entangling in meshes).

‡ *Barrier-nets.*

Rabbit-nets, used by Indians of the Southwest.

14405–6–7–8–9–10–11–12–13–14–15–16–17–18–19–20–21. Small rabbit-nets. Pi-Ute Indians, Southern Utah. Maj. J. W. Powell.
14500. Small rabbit-net. Pi-Ute Indians, Southern Utah. Maj. J. W. Powell.
11245. Small rabbit-net. " " "
12058. Small rabbit-net. " " "
12051, 53. Large rabbit-net. " " "
11247. Large rabbit-net. " " "
14430–31. Large rabbit-net. " " "
14401–2–3. Large bunt net (for rabbits). " "
19049. Rabbit-net. Cooyuwee Pi-Ute Indians, Southern Utah. Stephen Powers.

These nets are used largely in the capture of rabbits for food; they are stretched in long lines by means of slender crotched sticks which support the upper edge. The chaparral is then scoured for miles by the Indians on horseback and on foot, and the rabbits, which are very abundant in the sage-brush, are driven into the meshes of the nets. The species thus captured are the sage-hare (*Lepus sylvaticus* var. *artemisiæ*), and the mule or jackass hare (*Lepus callotis*).

Bird mesh-nets.

Gill-net.

Gill-nets used in Great Lakes.

25751. Model of Lake Michigan gill-net. Scale: Depth, 1 inch to the foot; length, ½ of inch to the foot. J. W. Milner.

The gill-netting in use on the Great Lakes is knit from linen thread, two and three ply (25–4, 2-cord, and 30–50, 3-cord), from eleven to twenty-

Meshing-nets (entangling in meshes).

Gill-nets used in the Great Lakes.

two meshes in depth, 3¼ to 5 inch mesh. The nets when hung or mounted for use contain from one to three pounds of webbing, and range in length from 60 to 120 yards, and in depth from 4½ to 6 feet. They are set in gangs of from three to five nets, and three to five gangs are laid out in one setting usually by aid of sailboats or steamers. (See models of Mackinaw boat and lake gill-net steamer.)

For floating the upper line, round or octagonal floats of bark, or wooden pickets about two and one-half feet in length, are used. Sinkers are of lead or stone. The nets are set in from 20 to 100 fathoms of water, the lead-line resting upon the bottom. They are taken out once a week and dried.

They are used principally for the capture of the whitefish (*Coregonus albus, &c.*), and the lake trout (*Salmo namaycush*), though most of the common lake fishes are taken in these meshes. Sea-Island cotton (3, 4, 5, and 6 thread) is being largely substituted for linen in their manufacture.

The weight of the twine preferred by fishermen varies in different localities, that used in Green Bay being the finest, that in Lake Erie next, then Lakes Michigan and Superior, and heaviest in Lake Huron. Lake Ontario consumes about 5,000 pounds of netting annually, Erie 7,500, Huron 6,000, Michigan 20,000, Green Bay 2,500, and Lake Superior 5,000. The aggregate length of this netting is probably about 4,575,000 yards.

Sisco and herring gill-nets.

Used in the Great Lakes in the capture of the sisco (*Salmo siscowet*) and the lake herring (*Argyrosomus clupeiformis*).

* These nets are hung and set like the whitefish-nets previously described.

They are knit from linen thread (35–60, 2-cord) 30 to 40 meshes in depth, and 2½ to 3 inch mesh. About 2,500 pounds are annually consumed, chiefly about Sacket's Harbor, N. Y., and Lakes Huron and Michigan. (E. B. French.)

Anchored gill-nets.

Used on the coast from Cape Cod to Cape Hatteras in the capture of the bluefish (*Pomatomus saltatrix*).

* These nets are knit from cotton twines (12–18 thread, ¼ patent), and are 75 to 100 fathoms in length, and 80 to 200 meshes in depth, from 4½ to 6 inch mesh. They are heavily leaded and anchored with lead-line on the bottom, off-shore, in from 10 to 20 fathoms of water. They are chiefly used by New York fishing vessels; probably 1,000 or more are in use on the coast. In the winter season the fishing vessels follow the bluefish as far south as Cape Hatteras. (E. B. French.)

Hook or trap gill-nets.

Used on the coast of New Jersey in the capture of the Spanish mackerel (*Cybium maculatum*), &c.

* These nets are peculiar in shape. They are straight nets, anchored in the form of an L with a hook-like continuation, heavily leaded, and with anchors at the angles. They are knit from cotton twines (9–12 thread, ¼ patent), the outer end being of finer twine. Their length is about 100 fathoms, depth 75–100 meshes, 3¾ to 4 inch mesh. About 100 of these are in use on the coast, mostly between Sandy Hook and Barnegat Light. (E. B. French.)

* The nets belonging to this series are enumerated below, among Nos. 26848–26880.

Meshing-nets (entangling in meshes).

Salmon hook-gill-net of the Saint Lawrence.

‡ *Drift-nets.*

† *Those drifting across the tide.*

Shad gill-nets used in Southern rivers.

26126, 26131-2. Model of shad gill-net. American Net and Twine Company, Boston and New York.

Used in rivers of the Atlantic coast.

These nets are knit of linen thread (22-50, 3-cord, and 20-60, 2-cord). They range in length from 50 to 200 fathoms, and in depth from 25 to 90 meshes, 4¼ to 5 inch mesh. They are used exclusively as drift-nets.

On the Connecticut River about 4,000 pounds of this netting are used annually. The average weight of a net is 30 to 40 pounds, its depth 45 to 50 meshes, 5¼ to 5½ inches.

On the Hudson River about 7,500 pounds are annually used, fine threads (50-75, 2-cord), 100 to 200 fathoms in length, and from 50 to 90 meshes in depth, 4¼ to 5 inch, weight from 15 to 30 pounds to the net.

In the Delaware, Potomac, and Chesapeake 20,000 pounds are used, from 30 to 60 meshes in depth, and 5½ (30 to 40, 2-cord) length, 75 to 100 fathoms.

In the rivers of North Carolina nets are made from coarse twine (22-35, 3-cord, and 20-35, 2-cord) 25 to 40 meshes in depth, 5-5½ gauge. Their length is about 100 yards. About 25,000 pounds are used annually.

In the rivers of South Carolina the twine is slightly finer than in North Carolina (25-35, 3-cord), 25 to 60 meshes deep, the size otherwise about the same. 1,500 pounds are used annually.

In Georgia and Florida about 6,000 pounds are used. This netting is knit from linen thread (30-40, 3-cord, and 25-35, 2-cord) 40 to 60 meshes in depth; 4¼ to 5¼ mesh. About 18 to 24 pounds are used in a net; its length 100 yards. (E. B. French.)

Herring gill-nets.

Used in Hudson and Delaware Rivers in capture of the alewife or herring (*Pomolobus pseudoharengus*).

*Knit from 30-40, 2-cord, thread, from 45 to 100 meshes in depth, 2½ to 3 inch mesh; about 13 pounds to a net on the Hudson and 6 to 7 pounds on the Delaware; the nets on the Hudson, 60 to 100 meshes, on the Delaware from 35 to 60. About 2,500 pounds used annually. (E. B. French.)

Mullet gill-nets.

Used principally on the Saint John's River, Florida.

Knit from coarse linen thread (16-25, 3-cord) and from 38 to 50 meshes in depth. The size of mesh varies with the season: in July 3½, August 3¾, September 4 inch. The average length of the nets is 100 to 150 yards. About 1,500 to 2,000 pounds in use on Saint John's River, and about 1,000 pounds of cotton ($\frac{1}{5}^{2}$ and $\frac{1}{6}^{2}$ to $\frac{2}{6}^{0}$) nets on the Gulf coast from 30 to 40 meshes in depth, 3½ to 3¾, not varying with seasons. (E. B. French.)

*The nets belonging to this series are enumerated below, among Nos. 26848-26880

Meshing-nets (entangling in meshes).

Series of samples of gill-netting. American Net and Twine Company, Boston and New York:

26848. Depth 15 meshes, size of mesh 1½ inch, No. 20 (3) thread.
26849. " 35 " " 2½ " " 40 (2) "
26850. " 100 " " 2½ " " 25 (3) "
26851. " 35 " " 2½ " " 30 (3) "
26852. " 50 " " 2¾ " " 25 (3) "
26853. " 22 " " 2¾ " " 35 (2) "
26854. " 50 " " 2¾ " " 16 (3) "
26855. " 100 " " 2⅞ " " 25 (3) "
26856. " 100 " " 3 " " 25 (3) "
26857. " 100 " " 3⅛ " " 25 (3) "
26858. " 16 " " 3¼ " " 25 (2) "
26859. " 16 " " 3¼ " " 30 (2) "
26860. " 40 " " 3⅜ " " 18 (3) "
26861. " 50 " " 4 " " 20 (3) "
26862. " 17 " " 4 " " 35 (3) "
26863. " 35 " " 4 " " 40 (3) "
26864. " 16 " " 4⅛ " " 35 (3) "
26865. " 45 " " 4⅛ " " 40 (3) "
26866. " 14 " " 4¼ " " 35 (3) "
26867. " 14 " " 4¼ " " 50 (3) "
26868. " 14 " " 4⅓ " " 35 (2) "
26869. " 14 " " 4⅓ " " 35 (2) "
26870. " 16 " " 4⅓ " " 35 (3) "
26871. " 16 " " 4⅓ " " 50 (3) "
26872. " 18 " " 4½ " " 50 (3) "
26873. " 16 " " 4⅔ " " 35 (3) "
26874. " 45 " " 5 " " 30 (2) "
26875. " 12 " " 5 " " 30 (2) "
26876. " 60 " " 5 " " 35 (2) "
26877. " 65 " " 5 " " 40 (2) "
26878. " 35 " " 5⅛ " " 35 (3) "
26879. " 75 " " 5¼ " " 35 (3) "
26880. " 11 " " 6 " " 35 (3) "

‡ *Drift-nets.*

† *Those drifting across the tide.*

26135. One bale of brown gill-netting. American Net and Twine Company, Boston, Mass.

26139. One bale of white gill-netting. American Net and Twine Company, Boston, Mass.

†† *Those drifting along the tide.*

Mackerel gill-nets.

Herring gill-nets.

26124-28-38. Herring gill-net. Used on the coast of New England and the Provinces in the capture of the herring (*Clupea harengus*). American Net and Twine Company, Boston, Mass.

Meshing-nets (entangling in meshes).

Herring gill-nets.

These nets are about 40 yards long and 150 meshes in depth. They are stretched together in big gangs, floated by pieces of wood and weighted by stones. They are made of 45 and 6 thread cotton from 14 to 20 yarn, 2¼ inch average mesh. American Net and Twine Company, Boston, Mass.

——. Model of herring gill-net. American Net and Twine Company, Boston, Mass.

Other gill-nets.

1667. Gill-net. Anderson River Eskimos. Anderson River, H. B. T. R. MacFarlane.

7962. Gill-net made of animal fiber. Kawquettle Indians. Vancouver's Island, B. C. Dr. T. T. Minor.

19043. Gill-net. Cooyuwee Pi-Ute Indians. Pyramid Lake, Nev. Stephen. Powers.

4765. Gill-net made of "Babiche." Anderson River Indians. Mackenzie's River district, H. B. T. MacFarlane.

Pocket-nets (entangling in pockets).

Trammel-nets.

25270. Model trammel-net. 10 feet long, 2 feet wide, 2 and 5 inch mesh. William E. Hooper & Sons, Baltimore, Md.

26118–29. Trammel-net. American Net and Twine Company.

Used for general fishing in rivers and ponds of Northern Mississippi Valley.

These nets range from 20 to 75 yards in length, 4 to 6¼ feet in depth. The inside netting of finer linen thread (20–25, 3-cord), mesh 2–2½, ½ deeper than the outside. The outside netting-wall from cotton (15–21 thread), mesh 8 to 10 inches. (E. B. French.)

31. ENCIRCLING-NETS.

Seines.

Seines.

26134. Seven bales of brown seine-netting. Used for manufacture of pounds, traps, seines, fykes, &c. American Net and Twine Company, Boston, Mass.

26139. Eighteen bales of white seine-netting. American Net and Twine Company, Boston, Mass.

Seal-seines.

17270. Seal-net made of sinew. Found wrapped about a mummy. Kagamil Island, Alaska. Alaska Commercial Company, San Francisco, Cal.

Manatee-seines.

Shad-seines.

Mullet-seines.

Menhaden-seines.

Seines.

Bass-seines.

Bluefish-seines.

Capelin-seines.

Herring-seines.

26119. Model of herring-seine. Used on coasts of New England and the Provinces in capture of herring (*Clupea harengus*), and in the Hudson, Potomac, Delaware, and Chesapeake, and in North Carolina. American Net and Twine Company, Boston, Mass.

26127. Model of herring-seine. American Net and Twine Company, Boston, Mass.

Shad-seines.

These are used in the rivers of the Atlantic and Gulf coast.

These seines are knit from cotton thread. On the Connecticut River, the seines are of nine-thread twine, 5–5½ mesh; on the Hudson, the mesh is four inches, knit of six-thread twine in the wings and nine thread in the bunt. In the Delaware, Potomac, and Chesapeake, the mesh is 3½ to 4½ inches, the twine 12, 15, and 18 thread; in North Carolina, the mesh is 2½ to 3½ inches, and the cotton twine twelve-thread. (E. B. French.)

Cod-seines.

26137. Model of cod-seine. Used in Provinces in capture of cod (*Gadus morrhua*). American Net and Twine Company, Boston and New York. 30 to 40 feet deep. Mesh 5 inches, 18 to 21 thread, cotton.

Lance-bunts.

Baird collecting-seines.

26136. Baird net. Designed by Prof. S. F. Baird. Used by naturalists in collecting small fishes in brooks and ponds and in following behind large seines to secure the small species which escape through the meshes, six-thread coarse cotton. American Net and Twine Company, Boston, Mass.

26126. Model of Baird net. American Net and Twine Company, Boston, Mass.

Bait-seines.

26123, 26130. Model of minnow-seine. Used by amateurs in capture of minnow-bait. ¼ to ⅛ inch mesh, six-thread cotton twine. American Net and Twine Company, Boston, Mass.

26121. Model of minnow-seine, with bag. Used by fishermen to secure bait for eel-pots. American Net and Twine Company, Boston, Mass.

26668. Minnow-seine. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.

Other seines.

2232. Seine. Anderson River Eskimos. Mackenzie's River district. Robert MacFarlane.

2444. Seine made of "babiche." Tschutchi Indians. Capt. John Rodgers, U. S. N., North Pacific Exploring Expedition.

Seines.

Other seines.

2445. Seine made of "babiche." Tschutchi Indians. Capt. John Rodgers, U. S. N., North Pacific Exploring Expedition.

2446. Hand-seine made of grass. Tschutchi Indians. Capt. John Rodgers, U. S. N., North Pacific Exploring Expedition.

2447. Hand-seine made of grass. Tschutchi Indians. Capt. John Rodgers, U. S. N., North Pacific Exploring Expedition.

19234. Salmon-net. McCloud River Indians. Shasta County, Cal. Livingston Stone.

20648. Salmon-net. Indians of Northwest coast. Fort Simpson, B. C. J. G. Swan.

2231. Hand-seine. Anderson River Eskimo. Mackenzie's River district, H. B. T. R. Kennicott.

21368. Fishing-net. Made from fiber of milkweed (*Asclepias* sp.). Hoochnorre Indians. South Eel River, Cal. Stephen Powers.

7929. Fishing-net. Made from fibers of pineapple (*Tillandsia* sp.). Mirador, Mex. Dr. Sartorius.

897. Fishing-net made of willow bark. Kootchin Indians. Mackenzie's River district, H. B. T. R. Kennicott.

4883. Net made of "silkweed." Fort Crook Indians. Fort Crook, Cal. Capt. J. W. T. Gardiner.

Hoop-nets.

Handle, or dip nets.

Bull-nets (worked with ropes and blocks).

Scoop-nets (herring-nets, pound-scoops, car-scoops, &c.).

25608. Bow of scoop-net. Used in dipping fish from smack's well. J. M. K. Southwick, Newport, R. I.

25165. Series of scoop-net hoops. Wilcox, Crittenden & Co., Middletown, Conn.

83, F. C. Frame of dip-net. Used in Bay of Fundy herring fisheries. U. S. Fish Commission.

25229. Folding dip-net frame. U. S. Fish Commission.

26141. Dip-nets. American Net and Twine Company, Boston, Mass.

26141. Minnow dip-nets. " "

26141. Crab dip-nets. " "

Landing-nets.

25494. Jointed staff and folded net-ring. Bradford & Anthony, Boston, Mass.

25492. Nason's patent net-staff and ring. Flexible ring carried inside of staff. C. F. Nason, patent August 31, 1875. Bradford & Anthony, Boston, Mass.

25493. Nason's patent solid net-staff. With flexible ring. C. F. Nason, patent August 3, 1875. Bradford & Anthony, Boston, Mass.

25235. Folding handles for dip-net or lance. U. S. Fish Commission.

25638. Braided linen landing-net (waterproofed). Bradford & Anthony, Boston, Mass.

25639. Braided silk landing-net. Bradford & Anthony, Boston, Mass.

658. Dip-net. Used in the capture of the oulachan (*Osmerus pacificus*). Northwest coast of America. G. Gibbs.

21725. Dip-net. Used by McCloud River Indians in fishing in small streams. Shasta County, Cal. Livingston Stone.

Hoop-nets.

Landing-nets.

26669. Landing-net. Property of J. A Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.
26711. Landing-net. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.
26664. Landing-net and rod. Property of J. A Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.

Eskimo auk-nets.

15616. Bird-net frame. Alient Eskimos. Alaska. Henry W. Elliott.

Baited hoop-net:

Crab-nets.

26591–2. Models of lobster-nets. Used on the coast of California. Johnson & Young, Boston, Mass.
26801. Crab-nets. American Net and Twine Company, Boston and New York.
32710. Open cunner-net. Gloucester, Mass. G. Brown Goode.
32711. Folding cunner-net. " "

Trailing-nets.

Trawls:

Beam-trawl.

(Otter-trawl.)

26882. Model of beam-trawl. American Net and Twine Company, Boston and New York.
32720. Model of beam-trawl. Made by J. G. Adam. U. S Fish Commission.

Dredges:

Flange, or ordinary dredge.

Rake-dredge.

Oyster-scraper.

(Coral-dredge.)

26140. Four brown dredge-nets. Oyster-dredging, &c. American Net and Twine Company, Boston and New York.

Towing-nets:

Surface tow-nets.

25228. Towing-net frame. U. S. Fish Commission.

Folding or jerk nets.

Purse-nets:

Mackerel purse-seines (pursed by weight).

Menhaden purse-seines.

29387. Model of mackerel purse-seine. Used on North Atlantic coast in capture of mackerel (*Scomber scombrus*). American Net and Twine Company, Boston, Mass.

Folding or jerk nets.

Menhaden purse-seines.

26,120. Model of mackerel purse-seine. American Net and Twine Company, Boston, Mass.

These purse-seines range in length from 120 to 220 fathoms, and from 750 to 1,000 meshes in depth, reaching the depth of 20 to 30 fathoms of water. The average mesh is 2½ inches. They are made of fine Sea-Island cotton twine, and cost from $750 to $1,500 complete. About 300 are now in use on the coast of North America. The pursing weight varies from 100 to 150 pounds.

26122–26125. Model of purse-seine. American Net and Twine Company, Boston, Mass.

90 to 150 fathoms in length, 300 to 650 meshes in depth, 1¾ to 2¾ fine Sea-Island twine. Wings, 9 to 12; bag, 15 to 21, coarse.

25179. Snatch-block used in pursing-seine. Higgins & Gifford, Gloucester, Mass.

25186. Ring or thimble for pursing-seine. Wilcox, Crittenden & Co., Middletown, Conn.

Cast-nets:

Mullet cast-nets.

Pompano cast-nets.

Bait cast-nets.

25046. Casting-net. Diameter 4½ feet. William E. Hooper & Sons, Baltimore, Md.

26799. Mullet cast-net. Diameter 5½ feet, 1½-inch mesh.

26800. Shrimp cast-net. Diameter 4½ feet, ¾-inch mesh.

Clap-nets for birds.

Rabbit spring-nets.

Spring-weirs (St. Lawrence).

Sieve-traps (for birds).

(Accessory.) Parts of nets and apparatus for manufacture.

Raw material of nets.

Babiche. (See under D. 20.)

Netting-fiber.

Netting-twine.

659. Netting-twine. Indians. Northwest coast of America. G. Gibbs.

14432. Fiber used for making nets. Pi-Ute Indians. Southern Utah. Maj. J. W. Powell.

29376. 38 bales of white netting-twine. American Net and Twine Company, Boston, Mass.

Samples of netting hung to lines. William E. Hooper & Sons, Baltimore, Md.:

25048. 1-inch mesh, 12 thread, 1 fathom long, 2 feet deep.

25049.	1¼	"	12	"	1	"	2	"
25047.	1½	"	12	"	1	"	2	"
25051.	1¾	"	12	"	1	"	2	"
25050.	2	"	12	"	1	"	2	"

(Accessory.) Parts of nets and apparatus for manufacture.

Netting-needles.
Mesh-needles.
Hanging-needles.
Eskimo netting-needles.

25596. Seine-needle (home made). J. M. K. Southwick, Newport, R. I.
25593. Seine-needle. " "
25712. Seine-needle (called hanging-needle). N. H. Payne, Wellfleet, Mass.
——. Knitting-gauge. Used in regulating size of mesh. American Net and Twine Company, Boston and New York.
9839. Seine-needle. Eskimos. Northeastern America. S. F. Baird.
16202. Seine-needle. Magemut Eskimos. Nunivak Island, Alaska. W. H. Dall.
5613. Seine-needle of wood. Yukon River. W. H. Dall.
5614. Needle of bone. Norton Sound Eskimos. "
16170, 16169, 16166, 16167, 16168, 16171, 16196. Seine-needles of bone. Magemut Eskimos. Nunivak Island. W. H. Dall.
1180. Seine-needle of wood. Chirikoff. W. H. Dall.
1315. Netting-needle. Eskimos. Smithsonian Institution.
9839. Seine-needle of bone. Eskimos of Northeastern America. S. F. Baird.

VI. TRAPS.

32. PEN-TRAPS.

Pocket-traps.

Pitfalls:
  Pits, covered.
  Barrel-traps.
  Jar mole-traps.
  "Rabbit-tipe," used in England.
Salmon-baskets (Columbia River).
Salmon-weirs (Upper Columbia River).
River-weirs, with pockets:
  Eel-traps.
Fish-slides:
  Shad-slides, used in the rivers of North Carolina.

25830. Fish-slide. Used in James River, Virginia. Scale 1 inch to the foot. J. G. Adam.
25831. Fish-slide (with box). Used in rivers of Virginia. Scale 1 inch to the foot. J. G. Adam.

Labyrinth-traps.

Corrals.
Turkey-traps.

Labyrinth-traps.

Weirs, or pounds.

12102. Bar-weir. Used in Bay of Fundy herring fisheries. Scale, 1 inch to 15 feet. Capt. W. S. Treat, Eastport, Me.

12101. Fish-weir. Used in Dennis River, Me. Scale, ½ inch to the foot. Prof. S. F. Baird.

12106. Salmon-weir. Used in rivers of Maine. Dennis River. Scale, 1 inch to 8½ feet. Prof. S. F. Baird.

26833. Model of heart-weir. American Net and Twine Company.

25750. Model of pound-net. Used in Lake Michigan. Scale, 3½ feet to 1 inch. Waukegan, Ill. D. D. Parmalee.

——. Model of weir, or heart-net. Used on southern coast of New England. Scale, 1 inch to 8 feet. Spindel's Cove, Wood's Holl, Mass. Prof. S. F. Baird.

26731, 26746. Models of brush-weirs. Used in the Bay of Fundy in capture of herring (*Clupea harengus*). W. B. McLaughlin, Grand Manan, N. B.

25829. Model of fish-weir. Used by aborigines of Virginia in the fifteenth century. From figures in De Bry. J. G. Adam.

25820. Model of fish-trap. Valley of Yukon River. Scale, 1 inch to the foot. W. H. Dall.

Funnel-traps.

Fish-pots.

1754. Wicker fish-pot (model). Used in West Indies. 5 to 15 fathoms. Scale, 1 inch to the foot. H. O. Claughton, St. Martin's, W. I.

32738. Fish-pot (model). Bermudas. Scale of ½. Made from wood of submerged cedar. G. Brown Goode.

Lobster-pots.

12100. Lobster-pot. Used in Bay of Fundy. 4 to 10 fathoms. Scale, ½ inch to the foot. Prof. S. F. Baird.

24801. Lobster-pot. Used in Narragansett Bay, in 10 to 15 fathoms. Scale 3 inches to the foot. J. M. K. Southwick, Newport, R. I.

29296. Model of Noank lobster-pot. G. L. Green, Noank, Conn.

29531. Lobster-pot net. Used on coast of New Jersey. American Net and Twine Company, Boston and New York.

26586-7-8-9. Models of lobster-pots. Used on the coast of New England. Johnson & Young, Boston, Mass.

29363. Model of lobster-pot. N. C. Smith, Stonington, Conn.

Eel-weirs, with leaders.

Eel-pots, without leaders.

——. Eel-pot. Used in Fisher's Island Sound, Conn. Scale, one-half. James H. Latham, Noank, Conn.

25015-16. Wicker eel-pot, two funnels, with leaders. Used about Martha's Vineyard, in 3 to 10 fathoms. Capt. Josiah Cleveland, maker, Vineyard Haven, Mass.

25014. Wicker eel-pot (three funnels). Used about Martha's Vineyard. Capt. Josiah Cleveland, maker, Vineyard Haven, Mass.

29530. Eel-pot net. Used on the coast of New Jersey. American Net and Twine Company, Boston and New York.

Labyrinth-traps.

Eel-pots, without leaders.

25016. Leaders for eel-pot (Nos. 25014–15–16). Used in Martha's Vineyard. Capt. Josiah Cleveland, Vineyard Harbor, Mass.
26802. Basket eel-pot. American Net and Twine Company.
25018. Roots of young pine trees (*Pinus strobus*). Used in manufacture of eel-pots. Vineyard Haven, Mass. G. Brown Goode.

Barrel-pots for eels.

Set-nets.

32733. C. Set-net. Diameter of largest hoop, 15 inches. U. S. Fish Commission.

Fykes (set-nets with leaders).

25045. Fyke-net with wings. Diameter, 3 feet. Wm. E. Hooper & Sons, Baltimore, Md.
26113. Model of minnow-fyke. American Net and Twine Company, Boston [and New York.
26114. Minnow-fyke. " "
26117. Minnow-fyke. " "

Bird-fyke.

26115, 26116. Model of bird-net. American Net and Twine Company, Boston and New York.

Bass-traps.

25704. Bass-trap. Used in Peconic Bay and Fisher's Island Sound. Scale, ½ inch to the foot. Charles T. Potter.

Door-traps.

† *Closed by the falling of a door.*

Box-traps (figure 4).

25833. Horan's box-trap. Used in Philadelphia Zoological Gardens. Scale, one-half. Henry Horan.
25478. Box-trap. Used in capture of hares, possums, etc. Scale, one-half. T. N. Woltz.

Traps with hanging doors.

——. Self-setting trap. Used in capture of muskrats, hares, &c. Scale, one-half. Henry Horan.
25703. Self-setting trap. To be set in mouth of rabbit-burrow. Scale, one-half. E. Herron.

Double box-traps.

25477. Double box-trap. Used in capture of hares, possums, &c. Scale, one-half. T. N. Woltz.

Door-traps.

Spring-door traps.

†† *Closed by falling of whole trap.*

Bowl-traps.

Cob-house bird-traps.

25659. Fall-trap. Used for partridges and other birds. Scale, one-half. T. N. Woltz.

25705. Fall-trap. Used in capture of partridges, &c. Scale, one-half. Henry Horan.

Pigeon-nets.

††† *Closed by falling of tide.*

Bar-weirs, arranged with the other weirs.

Sheaf-traps.

Sheaf-traps (New York Harbor).

33. CLUTCHING-TRAPS.

Noose-traps.

Snares:

Foot-path and barrier snares.

2033. Snare (made of sinew). Used in capture of lynxes, rabbits, &c. Fort Resolution, H. B. T. R. Kennicott.

19063. Rabbit-snare. Coowoye Pi-Ute Indians. Pyramid Lake, Nevada. Stephen Powers.

25660. Spring-trap (model). Used in capture of hares, grouse, &c. Scale, one-half. E. Herron.

25479. Spring-trap (model). Used for capture of hares, grouse, &c. Scale, one-half. T. N. Woltz.

25832. Model of grouse-snare. Yukon River, Alaska. W. H. Dall.

Springes.

"Round mouse-traps."

Jawed traps.

"Steel traps:"

Newhouse traps.

25262. Newhouse trap. No. 0 for rats. Spread of jaws, 3½ inches; strong enough to hold muskrat. Oneida Community, N. Y.

25261. Newhouse trap. No. 1 for muskrats. Spread of jaws, 4 inches; adapted to capturing the smaller fur-bearing animals. Oneida Community, N. Y.

25260. Newhouse trap. No. 1½ for minks and fishers. Spread of jaws, 4½ inches; strong enough to hold fox or fisher. Oneida Community, N. Y.

25259. Newhouse trap. No. 2, for foxes. With double spring; spread of jaws, 4¾ inches; strong enough to hold an otter. Oneida Community, N. Y.

Jawed traps.

"Steel traps:"

Newhouse traps.

25258. Newhouse trap. No. 3, for otters. Double spring; spread of jaws, 5½ inches. Oneida Community, N. Y.

25256. Newhouse trap. No. 4, for deer. Double spring; spread of jaws, 6½ inches. Oneida Community, N. Y.

25257. Newhouse trap. No. 4, for beavers. Double spring; spread of jaws, 6½ inches. Oneida Community, N. Y.

25255. Newhouse trap. No. 5, for bears. Spread of jaws, 11¼ inches; weight of each spring, 2 pounds and 10 ounces; weight of trap 17 pounds, suitable for taking the common black bear. Oneida Community, N. Y.

25254. Newhouse trap. No. 6, for grizzly bears and moose. Spread of jaws, 16 inches; weight of each spring, 6 pounds and 10 ounces; weight of trap with chain, 42 pounds; made throughout, except the pan, of wrought iron and steel; strong enough to hold the moose or grizzly bear. Oneida Community, N. Y.

29250. Spring fish-trap. (Patented Dec. 9, 1856.) Edwin W. Judge, New Haven, Conn.

Spring bird-nets.

(French bird-trap.)

13153. Spring bird-trap. Used in France. Dr. H. C. Yarrow, U. S. A.

34. FALL-TRAPS.

Crushing-traps.

Dead-falls.

Figure-four traps.

25749. Log dead-fall (model). Used in Mississippi Valley. Scale, 1 inch to the foot. Henry Horan.

15614. Fox-trap. Used by Mahlemut Eskimos. Henry W. Elliott.

Piercing-traps.

Spear-falls.

Mole-traps.

Harpoon-traps.

Spring-hooks.

Pickerel-hooks, arranged with other hooks.

35. MISSILE-TRAPS

Cross-bow traps.

Spring-guns.

36. ADHESIVE PREPARATIONS.

Bird-lime, &c.

Hoods, boots, &c.

VII. APPARATUS FOR WHOLESALE DESTRUCTION.

37. POISONS.

Food poisons.

Phosphorus poisons.
Strychnine.
Arsenic.
Corrosive sublimate.
Cyanide of potassium.
Opium poisons.

For obvious reasons this series is not exhibited.

Blood poisons: Woorara.

38. ASPHYXIATORS.

Apparatus for smoking out.
(Apparatus for suffocating with fumes of sulphur.)
Apparatus for drowning out.

39. TORPEDOES.

39½. STOMACH-SPRINGS.

Eskimo whalebone springs (used for killing bears).

7442. Stomach-springs. Used by Eskimo in capturing bears, &c. Fort Anderson, Arctic coast. R. McFarlane.

VIII. HUNTING-ANIMALS.

40. HUNTING-MAMMALS.

Dogs.
Hunting-leopard (*Cynailurus jubatus*).
Weasels and ferrets.
Otters.

41. ACCESSORIES TO HUNTING-DOGS.

Dog-whips.
Dog-whistles.

29255.	Dog-call (double).	Edwin M. Judge,	New Haven, Conn.
29256.	Dog-call.	"	"
29257.	Dog-call.	"	"
29258.	Dog-call.	"	"
29259.	Dog-call.	"	"

Dog-whistles.

29260. Dog-call. Edwin M. Judge, New Haven, Conn.
29261. Dog-call. " "
29262. Dog-call for whip. " "
29254. Police-call. " "
29255. Railroad-call. " "

Dog-collars.
Dog-food.
Dog-carts.
Dog-muzzles.

42. HUNTING-BIRDS.

Falcons.
Owls.
Cormorants (*Carbo sinensis*). Used in fishing in China.

43. ACCESSORY TO HUNTING-BIRDS.

Hoods.
Perches.
Cormorant-collars.

44. HUNTING-FISHES.

Remora (used in West Indies and Australia).

IX. DECOYS AND DISGUISES.

45. BAITS.

Natural baits.

Flies and other insects. (This should include a collection of those insects which, as the favorite food of fishes, are imitated in making artificial flies.) Arranged with hooks. (See under 29 *a*.)
Worms.
Mollusks.
Salted baits (prepared).
Menhaden.
Herring.
Squids.
Clams, long.
Clams, hen.
Pea-roe of cod (used in French sardine-fisheries, and largely exported).
Grasshopper paste, used as a substitute for pea-roe.
Tolling baits, "stosh," &c.

These articles, on account of their perishable nature, cannot well be exhibited.

Natural baits.

(Accessories.) Methods of preparing baits:
Bait-cutters.
Bait-mills.
Bait-ladles.
Wheelbarrows for bait-clams (Nantucket).

32740. Beach-cart. Nantucket, Mass. W. H. Chase, 2d.

Bait-boxes and cans.

25560. Five bait-boxes. Bradford & Anthony, Boston, Mass.
26394. Bait-box. Forest & Stream Publishing Company. Property of John A. Nichols, Syracuse, N. Y.
26693. Minnow-pail. " "
26692. Crab-can. " "
26691. Grasshopper-can. " "

Bait-needles.

Artificial baits.[1]

Trolling-spoons.[1]
Spinners.[1]
Squids and jigs.[1]
"Bobs," used in southern waters.[1]
Artificial flies.[1]

Accessories to artificial baits.[1]

a. Fly-hooks.[1]
b. Raw materials for making artificial flies.[1]
c. Tools for making artificial flies.[1]

Pastes.

DECOYS.

Scent-decoys.

Sound-decoys.

Animal-calls, whistles, &c.

7452, 2149. Deer-call. Eskimos. Mackenzie's River district. R. MacFarlane.
2253. Deer-call. Eskimos. Mackenzie's River district. R. Kennicott.

Bird-calls.

26653. Turkey-call. Used in Illinois. J. W. Milner.
26654. Turkey-call. Used in Maryland. G. W. Woltz.

[1] Arranged with hooks.

Sight-decoys.

Living decoy animals and birds.
Decoy-dogs, used in hunting ducks.
Stool-pigeons.
Tame decoy-ducks.
Tame decoy-brants.
Imitations of animals and birds.:

Decoy-waders (carved in wood).

25042. Black-breasted plover (*Squatarola helvetica*). P. Brasher, New York.
25041. Long-billed curlew (*Numeneus longirostris*). " "
25043. Yellow-shanks (*Gambetta flavipes*). " "

Decoy-waders (stamped in tin).

25909. Black-breasted plover (*Squatarola helvetica*). Herman Strater & Sons, [Boston, Mass.
25908. Golden plover (*Charadrius virginicus*) " "
25906–7. Red-breasted snipe (*Macrorhamphus griseus?*). " "
25910–11. Monstone (*Strepsilas interpres*). " "

These decoys are made hollow, stamped out in halves, hinged at head and tail to open and nest together. One dozen plover weigh 3 pounds, with box occupying a space of 8¼ by 9 inches, 3 inches deep. Patented.

Decoy swimming-birds (made from the skins of birds).

7127. Skin of canvas-back duck (*Fuligula vallisneria*) stuffed with dry tulé grass and fitted for decoy with strings and weights. Pi-Ute Indians. Robert Ridgway.
7128. Skin of red-head duck (*Fuligula ferina*, var. *americana*), fitted for use as decoy. Pi-Ute Indians. Robert Ridgway.
7129. Same. Robert Ridgway.
4783. Same. Pi-Ute Indians. Carson Lake, Utah. Capt. J. H. Simpson.
19031. Skin of widgeon (*Mareca americana*), fitted for use as decoy. Cooyuwee Pi-Ute Indians. Pyramid Lake, Nevada. Native name, *Imoodoowe*. Stephen Powers.
29532. Skin of a pin-tail duck (*Dafila acuta*), stuffed for use as a decoy. P. Louis Jouy, Washington, D. C.

Decoy swimming-birds (carved in wood).

25040. Brant (*Bernicla brenta*). P. Brasher, New York City.
25035. Mallard (*Anas boschas*). Henry A. Stevens, Weedsport, N. Y.
25242. " " Male. John Krider, Philadelphia.
25241. " " Female. " "
29540. Black duck (*Anas obscurus*). Francis Burritt, South Norwalk, Conn.
25034. " " A. Stevens, Weedsport, N. Y.
26051. Pin-tail duck (*Dafila acuta*). John Krider, Philadelphia.
26054. Bald-pate duck (*Mareca americana*). Male. John Krider, Philadelphia.
26055. " " Female. " "
25038. " " P. Brasher, New York City.
25031. Blue-wing teal (*Querquedula discors*). Henry A. Stevens, Weedsport, N. Y.

Sight-decoys.

Imitations of animals and birds:

Decoy swimming-birds (carved in wood).

25245. Blue-wing teal (*Querquedula discors*). Female. John Krider, Philadelphia.
25246. " " Male. " "
25244. Green-wing teal (*Nettion carolinensis*). " " "
25243. " " Female. " "
25039. Broad-bill duck (*Fuligula marila*). P. Bracher, New York City.
26058. " " Male. John Krider, Philadelphia.
26059. " " Female. " "
29541. " " Francis Burritt, South Norwalk, Conn.
25029. Scaup duck (*Fuligula affinis*). Henry A. Stevens, Weedsport, N. Y.
25032. Red-head duck (*Fuligula ferina*, var. *americana*). Henry A. Stevens, Weedsport, N. Y.
26056. " " " Male. John Krider, Philadelphia.
26057. " " " Female. "
25033. Canvas-back duck (*Fuligula vallisneria*). Henry A. Stevens, Weedsport, N. Y.
25037. " " Male. John Krider, Philadelphia.
26053. " " Female. " "
25036. Whistle-wing duck (*Bucephala americana*). Henry A. Stevens, Weedsport, N. Y.
25030. Butter-ball duck (*Bucephala albeola*). Henry A. Stevens, Weedsport, N. Y.

Decoy swimming-birds (stamped in tin, with wooden bottoms and head balance weights).

26047. Mallard (*Anas boschas*). Male. Herman Strater & Sons, Boston.
25905. " " Female. " "
26048. Black duck (*Anas obscura*). Male. " "
26049. " " Female. " "
26045. Red-head duck (*Fuligula ferina*, var. *americana*). Male. Herman Strater & Sons, Boston.
26046. Read-head duck (*Fuligula ferina*, var. *americana*). Female. Herman Strater & Sons, Boston.
26043. Canvas-back duck (*Fuligula vallisneria*). Male. Herman Strater & Sons, Boston.
26044. " " Female. "
25901. Whistle-wing duck (*Bucephala americana*). Male. "
25902. " " Female "
25903. Sheldrake (*Mergus americanus*). Male. "
25904. " " Female. "
25900. Surf duck (*Œdemia perspicillata*). "
26702. Decoys. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.

Imitations of fishes.

29366. Lure-fish. D. H. Fitzhugh, Bay City, Mich Used in fishing through the ice for salmon-trout.

Sight-decoys.

Imitations of fishes.

29294. Lure-fishes. William Morris, Lake City, Mich. Used in fishing through the ice for pickerel.

These lure-fishes are used to decoy large fish under holes in the ice so that they may be within reach of the spear.

Blanket decoy (for antelopes).

Lanterns and other apparatus for fire hunting and fishing.

Lanterns for still-hunting.

25238. Centennial dash-lamp. For sportsman's hunting-wagons. White Manufacturing Company, Bridgeport, Conn.

25239. Dash-lamp. Used for hunting and fishing. White Manufacturing Company, Bridgeport, Conn.

25236. Jack-lamp. For night-hunting and general camp uses. White Manufacturing Company, Bridgeport, Conn.

25240. Johnson's jack-lamp support. For night hunting and fishing. White Manufacturing Company, Bridgeport, Conn.

25237. Fishing-lamp. White Manufacturing Company, Bridgeport, Conn.

Lanterns for weequashing, or fire-fishing, for eels.

29365. Boat-lanterns. Used in bow of boat in weequashing or spearing eels by night. Southern New England, James H. Latham, Noank, Conn.

12107. Birch-bark used for torchlight fishing. Passamaquoddy Indians. Eastport, Me. Dr. E. Palmer.

32739. Torch for night fishing. Halifax, N. S. Capt. H. C. Chester.

47. COVERS.

Movable covers.

Masks.

Deer heads and antelope heads.

8420. Antelope decoy. Made from head of prong-horn antelope (*Antilocapra americana*). Prescott, Ariz. Dr. E. Coues, U. S. A.

——. Antelope decoy. Arizona. Dr. J. B. White, U. S. A.

5537. Deer decoy. Made from head of mule-deer (*Cervus macrotis*). Apache Indians. Edward Palmer.

Movable copses.

Covers for hunters.

Covers for boats.

Stationary covers.

Hunting-lodges.

X. PURSUIT, ITS METHODS AND APPLIANCES.

48. METHODS OF TRANSPORTATION.

Personal aids.

Snow-shoes.
Skates.
Alpenstocks and staves.
Portable bridges.

Animal equipments.

Harness:[1]
- Horse-trappings.
- Dog-harness.
- Girths, sinches.
- Bits, cabrestos, spurs.

Saddles:[1]
- Riding-saddles.
- Pack-saddles.
- Aparejos.
- Riding-pads (for buffalo hunting).
- Fur pack-saddle (Hudson's Bay Territory).

Vehicles:[1]
- Deer-sledges.
- Dog-sledges.
- Wagons.
- Dog-carts.
- Fish-carts, used in Nantucket.

Boats.

Hunting-boats, fishing-boats:
- Birch canoes.

Birch-bark canoes.

Used by Indians in hunting and fishing.

26615. Bark canoe. Passamaquoddy Indians. Eastport, Me. E. Palmer.
26614. Bark canoe. Sixteen feet long, thirty-seven inches wide. Montagnard Indians of Besamis. Labrador. R. H. Powell.
7630. Bark canoe. (Model.) Lower Ingalik, Alaska. W. H. Dall.
858. Bark canoe. (Model.) Chippeway Indians, Athabasca and Great Slave Lakes. B. R. Ross.
2358. Bark canoe. (Model; scale, about 1 inch to foot.) Northeastern America. J. Varden.

[1] Arranged with Ethnological series.

Boats.

Birch-bark canoes.

859. Bark canoe. (Model.) Slave Indians of Mackenzie's River. Fort Simpson, H. B. T. B. R. Ross.
641. Bark canoe. (Model.) Upper Columbia River. G. Gibbs.
12107. Birch-bark, used in manufacture of canoes. Passamaquoddy Indians. Eastport, Me. E. Palmer.

Wooden sea canoes.

Used by Indians of Northwest coast in hunting and fishing.

20592. Wooden canoe. Northwest coast. J. G. Swan.
13102. Wooden canoe. (Model.) Queen Charlotte Island. J. G. Swan.
2616. Wooden canoe. (Model.) Northwest coast. U. S. Exploring Expedition. Capt. Charles Wilkes, U. S. N.
20592. Wooden canoe. (Model.) Bella Bella, B. C. J. G. Swan.
2583. Wooden canoe. (Model.) Oregon. U. S. Exploring Expedition. Capt. Charles Wilkes, U. S. N.
1785. Wooden canoe. (Model). Northwest coast. Dr. George Suckley.
11082. Wooden canoe. (Model.) Alaska. Lieutenant Ring, U. S. N.
20895. Wooden canoe. (Model.) Haidah Indians. Prince of Wales Island, Alaska. J. G. Swan.

Wooden canoes.

Used by Indians of the Northwest coast in whaling and sea fisheries.

26785. Wooden canoe. (60 feet long.) British Columbia. J. G. Swan.
16269. Wooden canoe. (Model.) Sitka, Alaska. W. H. Dall.
21595. Wooden canoe. (Model.) Alaska. Dr. J. B. White.
21594. Wooden canoe. (Model.) Alaska. "
639. Wooden canoe. (Model.) Northwest coast. George Gibbs.
7285. Wooden canoe. (Model.) Neah Bay, Washington Territory. J. G. Swan.
16269. Wooden canoe. (Model, painted.) Ihliuket Indians. Sitka, Alaska. W. H. Dall.
640. Wooden canoe. (Model.) Northwest coast. George Gibbs.
1871. Wooden canoe. (Model.) Vancouver's Island. Dr. C. B. Kennerly.
811. Wooden canoe. (Model.) " "
26761. Wooden canoe. Model of Haidah canoe (with masts and pushing-sticks, for traveling, fishing, &c.). Queen Charlotte Island. J. G. Swan.
26760. Wooden canoe. Model of Haidah canoe (for deep sea and war). Queen Charlotte Island. J. G. Swan.
26763. Wooden canoe. Model of wooden canoe (with masts, paddles, pushing-sticks, and ivory harpoons). J. G. Swan.
26762. Wooden canoe. Model of Cogwell canoe (for deep sea and war). Flathead Indians. J. G. Swan.
26787. Wooden canoe. British Columbia. J. G. Swan.
26786. Wooden canoe. " "
26785. Wooden canoe. Dug-out canoe (60 feet long). British Columbia. J. G. Swan.

Boats.

Kyaks or bidarkas.

Used by Eskimos of Arctic America in hunting and fishing.

26617. Kyak. (13 feet 9 inches long, 30 inches wide.) Northwest coast. Sitka, Alaska. William Burling.
14971. Kyak. (Model.) Alaska. W. H. Dall.
16275. Kyak. (Model.) Kodiak. "
14971. Kyak. (Model, one hole.) Alaska. W. H. Dall.
21609. Kyak. (Model, one hole.) Alaska. Dr. J. B. White.
1127. Kyak. (Model, two-hole.) Koloshes, Aleutian Islands. Capt. J. R. Sands.
14970. Kyak. (Model.) Aleutian Islands. W. H. Dall.
21604. Kyak. (Model, 2-hole.) Alaska. Dr. J. B. White.
21605. Kyak. (Model, 3-hole.) Alaska. "
21610. Kyak. (Model, 3-hole.) Alaska. "
21606. Kyak. (Model, 4-hole.) Alaska. "
8788. Kyak. (Model.) Unabeet Eskimo. Norton Sound, Alaska. W. H. Dall.
26618. Kyak. Eighteen feet long, 22 inches wide. Greenland. Eskimo Joe.
562. Kyak. (Model.) East coast, Upernavik. Dr. Hayes.
14750. Kyak. (Model, with bird-spear, harpoon, and seal-skin float.) Eskimos, Tusiack, North Greenland. Prof. S. F. Baird.
2230. Kyak. (Model, with bird-spear, lances, and spear-rest.) Anderson River Eskimos. Mackenzie's River district. R. MacFarlane.

Umiaks or bidarras.

Used by Eskimos in whaling and sea fisheries.

1098. Umiak. (Model.) Fort Anderson, H. B. T. Robert MacFarlane.
15618. Umiak. (Model of frame.) Saint Lawrence Island, Alaska. H. W. Elliott.

Indian raft-boats.

Used in hunting and fishing.

19028. Raft of tulé grass. (Model.) Pi-Ute Indians. Pyramid Lake, Nev. Stephen Powers.

Dug-out canoes.

Used by Indians of Pacific coast.

21358. Dug-out canoe. (Model.) Hoopah Indians, Trinity River, Cal. S. [Powers.
21359. Dug-out canoe. (Model.) " ."

Dug-out canoe.

Used in river fisheries of the Southern States.

25728. Dug-out canoe. (Model; scale, inch to foot.) Saint John's River, Florida. Francis C. Goode.

Boats.

Portable boats.

29506. Hegeman portable folding boat. Length, 10 feet; width, 3 feet. Hegeman Portable Folding Boat Company, Ballston Spa, N. Y.

Directions for setting up boat:

1. Unfold the frame.
2. Place the knees and seats in position before fastening the bottom-end section at the ends of the boat.
3. Fasten the bottom-end section to the ends of the boat by the thumb-screws.
4. Place on the canvas with the cords and tie in a single loop (or bow knot).

22218. Model of Colvin portable canvas boat. (Patented Oct. 6, 1874.) R. A. Scott & Co., Albany, N. Y.

"This boat consists of a canvas exterior made thoroughly water-proof by a preparation which preserves the strength of the canvas and prevents decay and oxidation. It is shaped like a canoe, sharp at both ends, and cuts the water handsomely. Along the sides and bottom are leather thongs, by which the boughs and limbs cut for frame can be lashed securely to the canvas, with the assistance of the four leather framing blocks or sockets (two for each end), which connect the stem and stern posts (or prow pieces) with the keelson, and it can be readily put together anywhere in the woods, no tools being required for the purpose, excepting such as are *always carried* by a party of sportsmen, or others, an ax or hatchet only being needed. The whole of it can be packed away in a space 24 inches long, 6 inches wide, and 3 inches thick. The size now made (No. 3), although but 12 feet long, will carry six men, or four men with their necessary baggage, and weighs but 12 pounds when rolled up. It has been tested in a heavy sea with a frame of green boughs cut only two hours before, and carried a weight of 700 pounds safely and easily."

25879-26-112. Model of Fenner's portable boat. With canvas bottom. C. A. Fenner, Mystic River, Connecticut.

One of these models is shown closed up in its case ready for transportation, the other set up for use.

Canoes.

26619. Paper canoe "Maria Theresa." N. H. Bishop, Lake George, N. Y.

Designed by Rev. Baden Powell, of England; built by E. Waters & Sons, of Troy, N. Y. Dimensions: length, 14 feet; beam, 28 inches; depth (amidship), 9 inches; weight of canoe, 58 pounds; weight of canoeist, 130 pounds; weight of outfit, 90 pounds; total, 278 pounds. Rowed by Mr. N. H. Bishop (from Troy, N. Y., 2,000 miles) while on his first geographical journey from the Gulf of Saint Lawrence to the Gulf of Mexico, 2,500 miles, during 1874 and 1875. Since the completion of the voyage all injuries the hull sustained were remedied by the simple application of a sheet of paper and a coat of shellac varnish to the outside of the boat. When in use a piece of canvas covers the undecked part of the canoe and keeps the interior dry. Water-courses traversed by Mr. Bishop during 1874 and 1875: From Quebec, rivers Saint Lawrence and Richelieu,

Boats.

Canoes.

Lake Champlain, and canal to Albany; the Hudson, Kill Von Kull, and Raritan rivers and canal, and the Delaware to Philadelphia; Delaware River and bay to Cape Henlopen, and interior salt-water passages on coast of Maryland and Virginia to Norfolk; the Elizabeth River and canal to Currituck Sound, Albemarle, Pamlico, Cove, Bogue, Stump, and other sounds, to near Wilmington, N. C.; Waccamau River to Georgetown, S. C.; by salt-water creeks, rivers, bays, and sounds along the coast of the United States to Florida; from Atlantic coast, via Saint Mary's and Suwannee rivers, to Gulf of Mexico.

26628. Rice Lake canoe. William English, Peterborough, Ontario.

Coracles or skin boats.

6785. Skin boat. Hidatza (*Gros Ventres*) Indians. Fort Buford, Dakota. Dr. W. Mathews, U. S. A.

Whale boat (used in whale fisheries).

24880. Whale-boat. (Model, with all fittings; scale, 1 inch to foot.) Capt. L. Howland, New Bedford, Mass.

24868. Whale-boat. (Model.) C. H. Shute & Son, Edgartown, Mass.

26839. Whale-boat, 35 feet long. Williams, Haven & Co., New London, Conn.

This boat is mounted with all the gear used in the capture of the whale.

Seine-boat.

25827. Model of Cape Ann seine-boat. Higgins & Gifford, Gloucester, Mass.

This model shows the fittings manufactured for seine-boats by Wilcox, Crittenden & Co., Middletown, Conn., to wit: cleat, stern-cap, snatch-block for pursing-seine, steering-oarlock with stern socket, socket used on side of stern for steering, davit-iron, tow-iron, tow-link and hook, belaying-pin, oar-holder, davit-guard and step-plate, breast-brace and eye-plate or oar-holder swivels, all of which are shown in their proper places by full-size models.

Dorys, sharpies, and dingies.

25657. Nantucket dory. (Model; scale, 1 inch to the foot.) William H. Chase.

Used in gathering clams for codfish-bait.

12678. New England dory. (Models; scale, 1 inch to the foot.) Starling & Stevens, Ferryville, Me.

13493. New England dory. (Model; scale, 1 inch to the foot.) Starling & Stevens, Ferryville, Me.

Used in coast fisheries and bank cod fisheries.

24752. Connecticut sharpy. (Scale, 1 inch to the foot.) Capt. H. C. Chester, Noank, Conn.

oats.

Italian fishing-boats.

Used in harbor fisheries of California.

22213. Italian fishing-boat. (Model; felucca rig.) San Francisco. Liv-[ingston Stone.
22214. Italian fishing-boat. (Model; felucca rig.) " "
22215. Italian fishing-boat. (Model; felucca rig.) " "
22217. Italian fishing-boat. (Model.) Chinese fishing-boat. San Francisco. Livingston Stone.

Pinkies.

25729. Martha's Vineyard pinkie-boat. (Model; scale, ¼ inch to the foot.) William H. Chase.
Used in shore fisheries.
25898. Norman's Land pinkie-boat. (Model; scale, inch to the foot.) Capt. William Cleveland, Vineyard Haven, Mass.
Used in cod and coast fisheries.

Hunting-skiffs.

Used for hunting and fishing in mountain lakes.

26621. Adirondack boat. Full size. Frederick D. Graves, maker, Boston, Mass.
25681. Adirondack boat. (Model; scale, ¼ inch to the foot.) Frederick D. Graves, maker, Boston, Mass.
Dimensions: 15 feet long, 3 feet 6 inches wide; weight, 75 to 80 pounds. For the use of sportsmen this boat is claimed to excel, on account of its *extreme lightness* and *durability*, one man being able by means of a yoke to carry the same to any distance without fatigue. This boat is also adapted for family purposes, the *patent rowlock* enabling the most inexperienced rower of either sex to propel the boat with ease and perfect safety, and without any possible chance of losing the oars.
25899. Ausable boat. (Model.) D. L. Fitzhugh, jr., Bay City, Mich.
Used in trout and grayling fishing, with well for live fish. Length, 16 feet; sides twelve inches high inside, 2 feet 10 inches wide on top, 2 feet 4 inches at bottom.
26624. Saint Lawrence boat. (Length, 19 feet; width, 43 inches.) Henry Sweetman, Clayton, N. Y.
Used in trolling in the Thousand Island region. Length, 19 feet; width, 43 inches.
25053. Alexandria Bay boat. (Model.) Cornwall & Walton, Alexandria, N. Y.
Used for hunting and fishing in the Adirondacks and the Saint Lawrence.

Sea boats.

24999. New England surf-boat. (Model; scale, 2 inches to the foot.) Cragin & Sheldon, makers, Boston, Mass.
Used in harbor, lake, and river fisheries.
25001. Whitehall-boat (18 feet). (Model; scale, 2 inches to the foot.) Cragin & Sheldon, Boston, Mass.
25000. Ship's yawl. (Model; scale, 2 inches to the foot.) Cragin & Sheldon, Boston, Mass.
Carried by coasters and fishing smacks.

Boats.

Sea boats.

22216. San Francisco yawl. (Model.) Livingston Stone.
Used by Italian fishermen on coast of California.

25028. Nantucket Harbor boat. (Model; scale, 1 inch to the foot.) W. H. Chase.
Used in harbor fishing.

Oyster-canoes.

25003. Chesapeake oyster-canoe (made from two logs). (Model; scale, 1 inch to the foot.) Major T. B. Ferguson, Maryland Fish Commission.
Used for oyster-raking in Chesapeake Bay.

25002. Chesapeake canoe-pungy. (Model; scale, 1 inch to the foot.) Major T. B. Ferguson, Maryland Fish Commission.
Used in oyster-dredging in Chesapeake Bay.

Ducking-boats.

25658. Egg Harbor boat. (Model; scale, inch to the foot. P. Brasher, New York City.
Used for hunting in marshes and bays.

26620. Cedar duck-boat "Central Republic." Built by Capt. George Bogart, surfman, Manahawken, Ocean County, New Jersey. Dimensions: 12 feet long, beam 3 feet 11 inches, depth 12 inches. N. H. Bishop, Lake George, N. Y.
This is the boat in which Mr. Nathaniel H. Bishop, of Lake George, Warren County, New York State, rowed from Pittsburg, Pa., via Ohio and Mississippi Rivers and the Gulf of Mexico (2,600 miles) to Cedar Keys, Fla., while on his second geographical expedition during 1875–76.

26623. New Jersey sneak-box. (Model; scale, 1 inch to the foot.) John D. Gifford, Tuckerton, N. J.
These boats are from twelve to fourteen feet in length; the shelving or sideboards on the stern of the boat are used to hold the decoys while the hunter rows to and from the shooting ground. Used by gunners on Barnegat and Little Egg Harbor Bays, New Jersey.

26622. Maryland ducking-sink. (Model; scale, 1 inch to foot.) J. G. Adam.
Used by gunners on the Potomac River and Chesapeake Bay.

Cat-rigged fishing-boats.

12099. Bay of Fundy cat-boat. (Model; scale, ½ inch to the foot.) Captain Hallet, Eastport, Me.
Used in herring fisheries.

25026. Martha's Vineyard cat-boat. (Model; scale, ½ inch to the foot.) William H. Chase.
Used in coast fisheries.

29537. Providence River cat-boat. (Model; scale, inch to the foot.) J. M. K. Southwick, Newport, R. I.
These boats vary in length from 14 to 19½ feet, and cost from $225 to $425. Used by lobster fisheries and hook and line fisheries. Built by J. U. Stoddard.

26585. Two-masted cat-boat. (Model; scale, about ½ inch to the foot.) Johnson & Young, Boston, Mass.
Used in New England lobster fisheries.

Boats.

Schooner-rigged fishing-vessels.

26809. Noank lobster-boat. (Model.) Capt. H. C. Chester, Noank, Conn.

25825. Block Island boat. (Model; scale, ½ inch to the foot.) Capt. H. C. Chester.
Used in cod fisheries and shore fisheries.

25730. Massachusetts schooner-smack. (Model; scale, ½ inch to the foot.) William H. Chase, Boston, Mass.
Used in mackerel fisheries and winter oyster trade.

25731. Maine schooner-smack. (Model; scale, ½ inch to the foot.) Capt. H. C. Chester.
Used in bank cod fisheries and eastern mackerel fisheries.

26536. Oyster-schooner. (Model; scale, 1 inch to the foot.) T. B. Ferguson, Maryland Fish Commission.
Used in oyster-dredging in Chesapeake Bay.

26584. Schooner-smack. (Model; scale, about ½ inch to the foot.) Johnson & Young, Boston, Mass.
Employed in the New England lobster fisheries.

25727. Noank well-smack. (Model; scale, ½ inch to the foot.) H. C. Chester, Noank, Conn.
Supplies fresh fish to local markets and New York iced-fish trade.

24883. Schooner-yacht. (Model; scale, ½ inch to the foot.) William H. Chase.
Used in pursuit of sword-fish and blue-fishing.

22220. Gloucester schooner-smack, style 1835. (Model.) M. M. McFadyn.
First form of sharp-bowed schooner, out of which the present Gloucester schooner was developed.

22219. Old-fashioned topmast schooner. (Model.) A. R. Crittenden.

26584. Schooner-smack. (Model; scale, about ½ inch to the foot.) Johnson & Young, Boston, Mass.
Used in the New England lobster fisheries.

Ships.

25726. Whaling-ship. (Model.) C. H. Shute & Son, Edgartown, Mass.
Crew engaged in cutting in the blubber.

24881. Whaling-bark. (Model; scale, ½ inch to the foot.) U. S. Fish Commission.
Used in northern whale fisheries.

24882. Merchant ship. (Model; scale, ½ inch to the foot.) U. S. Fish Commission.
Used in foreign trade.

Boats of Great Lakes.

26625. Mackinaw boat. (Model.) J. W. Milner.
Used in fisheries of the upper great lakes.

26626. "Norwegian boat" (Model.) J. W. Milner.
Used in Lake Michigan fisheries.

26790. Lake Erie pound boat. (Model.) J. W. Milner.

26627. Square-stern boat. (Model.) J. W. Milner.
Used in Great Lake fisheries.

Steamers.

25824. Menhaden steamer with seine-boats. (Model.) Joseph Lawler, Bristol, Me.

——. Gill-net steamer. (Model.) N. Crooks, Milwaukee, Wis.

Boats.

Steamers.

25027. Gill-net steamer. (Model; scale, 1 inch to 5 feet 5 inches.) Used in Lake Michigan fisheries.

25027. "Camel" floating-dock. (Model; scale, 1 inch to 5 feet 5 inches.) William H. Chase.

26808. "Camel" floating-dock. Model of steamship Cuba. Deposited by F. McFadden, Philadelphia.
Built in 1842 for floating loaded ships over Nantucket bar.

Apparatus accessory to rigging fishing-vessels.

Blocks.

25821. Three single iron-sheaved, plain-hook tackle blocks. Walter Coleman & Sons, Providence, R. I.

25820. Two double iron-sheaved, plain-hook tackle blocks. Walter Coleman & Sons, Providence, R. I.

25806. "Dead-eye" block. Used to secure the standing or fixed rigging to the hull of the vessel. Walter Coleman & Sons, Providence, R. I.

25804. "Heart" block. Used to secure the standing or fixed rigging to the hull of the vessel. Walter Coleman & Sons, Providence, R. I.

25805. "Bull's-eye" block. Used to secure the standing or fixed rigging to the hull of the vessel. Walter Coleman & Sons, Providence, R. I.

25819. One single brass-sheaved, sister-hook tackle block. Walter Coleman & Sons, Providence, R. I.

25152. Series of boat-blocks. Used on small fishing-boats around Cape Cod and Newport. Wilcox, Crittenden & Co., Middletown, Conn.

25817. One single brass-sheaved, sister-hook tackle block. Walter Coleman & Sons, Providence, R. I.

25818. One double iron-sheaved, sister-hook tackle block. Walter Coleman & Sons, Providence, R. I.

25812. Round block. For jib-sheets and small craft. Walter Coleman & Sons, Providence, R. I.

25816. Two double brass-sheaved, plain-hook tackle block. Walter Coleman & Sons, Providence, R. I.

25815. Common iron sheave. Walter Coleman & Sons, Providence, R. I.

25814. Plain brass sheave. Walter Coleman & Sons, Providence, R. I.

25813. Patent brass-roller sheave. Walter Coleman & Sons, Providence, R. I.

29444. Improved swivel-hook. For blocks and general use. Daniel Walker, Providence, R. I.

Clews and hanks.

25139. Ship's clew for courses. Wilcox, Crittenden & Co., Middletown, [Conn.

25140. Earing-ring. " "

25141. Throat-ring. " "

25221. Sail-clew. " "

25135. Series of spectacle or fore-and-aft clews. With patent clew-thimbles. Wilcox, Crittenden & Co., Middletown, Conn.

25136. Improved heart-clew. Wilcox, Crittenden & Co., Middletown, Conn.

25142. Tack-ring. " "

25137. Series of topsail clew-bows. " "

25138. Series of clew-bars. " "

Apparatus accessory to rigging fishing-vessels.

Clews and hanks.

29475. Clement's patent self-adjusting jib-hank. Wilcox, Crittenden & Co., Middletown, Conn.

25143. Jib-head, with patent clew-thimble, used where the jib has been stretched too much; the jib is shortened at the head; and the jib-head is attached to the sail. Wilcox, Crittenden & Co., Middletown, Conn.

25803. Jib-hank. Goes on jib-stay to hold the sail to it. Walter Coleman & Sons, Providence, R. I.

25777. Wooden jib-hank. Samuel Elwell, jr., Gloucester, Mass.

25156. Series of single-stay jib-hanks. Wilcox, Crittenden & Co., Middletown, Conn.

25157. Series of double-stay jib-hanks. " "

25215. Self-adjusting jib-hank for double stay. Clement's patent. Wilcox, Crittenden & Co., Middletown, Conn.

25214. Patent self-adjusting jib-hank. Clement's patent. Wilcox, Crittenden & Co., Middletown, Conn.

29460. Jib-sheet block (peculiar to Gloucester fishing-vessels). Samuel Elwell, jr., Gloucester, Mass.

25158. Pratt's patent jib-hank or yacht-jib. Wilcox, Crittenden & Co., Middletown, Conn.

25207. Hook-and-eye for bonnet of jib. " "

Chocks.

29468. Line-chock for whale-boat. Provincetown style. William W. Smith, Provincetown, Mass.

25180. Line-chock for whale-boat. Wilcox, Crittenden & Co., Middletown, Conn.

25216. Bow-chocks. " "

25195. Boat-chocks. " "

Boat-hooks.

25926. Whaler's large-ring boat-hook. E. B. & T. Macy, New Bedford, Mass.

25614. Whale-boat boat-hook (peculiar to New Bedford). Humphrey S. Kirby, New Bedford, Mass.

25196. Series of wrought-iron boat-hooks. Wilcox, Crittenden & Co., Middletown, Conn.

25200. Boat-hook for gunboat. " "

25226. Boat-hook. U. S. Fish Commission (deposited).

25197. Double Navy boat-hooks with ball points. Wilcox, Crittenden & Co., Middletown, Conn.

25198. Series of Navy boat-hooks with ball points. " "

25199. Series of sharp-pointed boat-hooks. " "

Belaying-pins.

25161. Series of belaying-pins. Wilcox, Crittenden & Co., Middletown, Conn.

25169. Belaying-pin for Cape Ann seine-boat. " "

25766. Two belaying-pins. Samuel Elwell, jr., Gloucester, Mass.

Apparatus accessory to rigging fishing-vessels.

Riggers' hooks.

25194. Deck or hammock hook. Wilcox, Crittenden & Co., Middletown, [Conn.
25195. Hammock-hook. " "
25206. Series of riggers' sister-hooks. " "
25145. Wide-mouthed single-hooks, or Cape Ann bonnet-hooks. Wilcox, [Crittenden & Co., Middletown, Conn.
29478. Bonnet-hook and grommet. " "
29452. Bonnet-hook-and-eye, for removing the jib. Wilcox, Crittenden & [Co., Middletown, Conn.
25155. Series of hooks and thimbles. " "
25943. Purrel hooks. S. Elwell, jr.
25144. Sister-hooks. Wilcox, Crittenden & Co., Middletown, Conn.
25150. Sailmaker's bench-hook. " "
25149. Sailmaker's heaver. " "
25207. Hook-and-eye for bonnet of jib. " "
25185. Hook-and-eye plate. " "

Grommets.

25116. Series of galvanized-iron sail-grommets (Wilcox's patent). Wilcox, Crittenden & Co., Middletown, Conn.
25117. Series of brass sail-grommets (Wilcox's patent). Wilcox, Crittenden & Co., Middletown, Conn.
25118. Series of brass grommets. Conical point, rolled rim. Wilcox, Crittenden & Co., Middletown, Conn.
25119. Series of metallic grommets. First used in America. Wilcox, Crittenden & Co., Middletown, Conn.
25120. Series of brass grommets. First patented in America. Wilcox, Crittenden & Co., Middletown, Conn.
25121. Rope-yarn grommets (with worked holes showing mode of use). Wilcox, Crittenden & Co., Middletown, Conn.
25128. Series of light, galvanized grommet-rings. Wilcox, Crittenden & Co., Middletown, Conn.
25129. Series of heavy galvanized sail-thimbles. Wilcox, Crittenden & Co., Middletown, Conn.
25130. Series of heavy iron sail-thimbles (Navy pattern). Wilcox, Crittenden & Co., Middletown, Conn.
25122. Galvanized-iron ring grommet, with worked holes showing mode of use. Wilcox, Crittenden & Co., Middletown, Conn.
25123. Series of buntline leaders and earing grommets. Wilcox, Crittenden & Co., Middletown, Conn.
25124. Series of eyelet grommets. Used to line worked holes and couplings to Wilcox's patent grommets. Wilcox, Crittenden & Co., Middletown, Conn.
25125. Setting-die. Used for inserting eyelets. Wilcox, Crittenden & Co., Middletown, Conn.
25126. Cutting-punch. Used for cutting grommet-holes. Wilcox, Crittenden & Co., Middletown, Conn.
25127. Series of heavy grommet-rings. Used for earings. Wilcox, Crittenden & Co., Middletown, Conn.
25131. Series of light iron sail-thimbles. Wilcox, Crittenden & Co., Middletown, Conn.

Apparatus accessory to rigging fishing-vessels.

Grommets.

25132. Series of throat-thimbles. Gloucester pattern. Wilcox, Crittenden & Co., Middletown, Conn.
25133. Series of reef-tackle or saddle-thimbles. Wilcox, Crittenden & Co., Middletown, Conn.
25134. Series of brass sail-thimbles. Wilcox, Crittenden & Co., Middle-[town, Conn.
25152. Series of open or riggers' thimbles. " "
25153. Series of wire-rope thimbles. " "

Anchors.

25162. Boat-anchor. Wilcox, Crittenden & Co., Middletown, Conn.
25163. Grappling-iron for dory. " "
25219. Wooden killick or coast anchor. H. C. Chester, Noank, Conn.
29249. Series of sailors' palms (from best to the poorest). Wilcox, Crittenden & Co., Middletown, Conn.
29423. Sailor's palm (left hand). Wilcox, Crittenden & Co., Middletown, [Conn
29424. Sailor's roping palm, A 1 (right hand). " "
29454. Superior cast-steel sail-needles. " "

Mast-gear.

25802. Six "purrel trucks." Used on a rope around the mast to keep the gaff on the mast. Walter Coleman & Sons, Providence, R. I.
25807. Mast-hoop. Used to hold the sail to the mast. Walter Coleman & Sons, Providence, R. I.
25808. Lace trucks. Used on the foot of sail to attach it to the boom. Walter Coleman & Sons, Providence, R. I.
25159. Series of boat-mast hoops. Wilcox, Crittenden & Co., Middletown, Conn.
25810. Mast-head truck. Used on top of mast to display bunting and signals. Walter Coleman & Sons, Providence, R. I.
25811. Mast-head ball. Used on top of the topmast to display bunting and signals. Walter Coleman & Sons, Providence, R. I.
29480. Mast-head gear for dory. Amasa Taylor, Provincetown, Mass.
29481. Mast and boom attachment for dory. " "
29484. Mast and gaff attachment for whale-boat (new style). Used by Provincetown whalers. Wilcox, Crittenden & Co., Middletown, [Conn.
25181. Mast-hinge for whale-boat. " "

Leaders and foot-stops.

25604. Series of sail-leaches and boom foot-stops. Used by Newport smackmen. J. M. K. Southwick, Newport, R. I.
25193. Boom foot-stops. Wilcox, Crittenden & Co., Middletown, Conn.
25181. Mast-hinge for whale-boat. " "
29450. Fair-leader. Used on the booms of Gloucester vessels. Samuel Elwell, jr., Gloucester, Mass.
29463. Patent topsail travelers. Used on square-rigged vessels. Wilcox, Crittenden & Co., Middletown, Conn.
29449. Mast-hook clutch. E. A. Sawyer, Portland, Me.

Apparatus accessory to rigging fishing-vessels.

Boat-builders' materials.

25170. Ring-bolts. Wilcox, Crittenden & Co., Middletown, Conn.
25201. Series of screw eye-bolts. " "
25202. Series of screw ring-bolts. " "
25203. Series of ring-bolts. " "
25211. Common oval head clinch boat-nail. Wilcox, Crittenden & Co., [Middletown, Conn.
25212. Chisel-point clinch boat-nails. "
25213. Countersunk clinch boat-nails. "
25220. Series of boat-rivets. "
25223. Washers or clinch-rings for rivets. "
25178. Stem cap for Cape Ann seine-boat. "
25173. Davit-guard and step-plate for Cape Ann seine-boat. "
25175. Eye-plate or oar-holder swivels for Cape Ann seine-boat. "
25176. Gunwale supporter for Cape Ann seine-boat. "
25173. Davit-guard and step-plate for Cape Ann seine-boat. "
25174. Breast-brace for Cape Ann seine-boat. "
25166. Davit-iron for Cape Ann seine-boats. "
25167. Tow-iron for Cape Ann seine-boats. "
25168. Tow-link and hook for Cape Ann seine-boat. "
29482. Boom-rest or crotch-socket. Used on the taffrail of Cape fishing-vessels when they are "laying to" on George's Banks. Theo. Brown, Wellfleet, Mass.
25204. Water-deck iron. Wilcox, Crittenden & Co., Middletown, Conn.

Rudder-fixtures.

29496. "W. N. Clark's rudder-hanger." (Patented September 3, 1867.) James B. Clark, Chester, Conn.

"Advantages claimed for this hanger: To ship the rudder one has only to enter the tongue (which has the rudder already attached) in the grooved plate from the top just far enough to get it steady, and then let it down, when it will go to its place without further care. Hence arises the first great advantage which this hanger possesses over the old way, viz, the ease and dispatch with which the rudder can be shipped under all circumstances.

Every boatman knows the trouble he has been to, at times, in trying to ship his rudder, while in a seaway, in the dark, or in muddy water, when the eyes in the boat could not be seen; often being obliged to reach down with his hand to get the lower pintle entered.

From the quickness with which the rudder can be shipped, in any position of the boat, and under any circumstances, and its security when shipped, it must recommend itself for all life-boat purposes, where, in case of an emergency, time is of vital importance.

Another advantage is that with this hanger the rudder cannot of itself unship as has often been the case with the common hanger, when the boat has been left for a short time and the tiller worked out, thereby leaving the rudder free, by striking the bottom or anything sufficient to raise it three or four inches, to unhinge and float away. As will readily be seen, this cannot get away until the rudder has risen the whole length of the tongue, which, of itself, would never happen.

Again, with this hanger the rudder can be shipped and unshipped while under full sail, thus making it very convenient for fishermen or

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Rudder-fixtures.

any one sailing over a line or seine, as the rudder can be easily raised far enough to pass over and prevent a line getting caught between the rudder and boat, as would otherwise likely ensue, and when over, by simply letting down the rudder, it will go to its place again ready for use.

By this arrangement we are enabled to get the hinges further down on the rudder, thereby bringing the strain on both of them, while in the old way, the lower eye and pintle are so far from the bottom of the boat, in order to facilitate the shipping of the rudder, that this one has to bear nearly all of the strain." (W. N. Clark.)

25190. Rudder-gudgeons. Wilcox, Crittenden & Co., Middletown, Conn.
25182. Rudder-braces for whale-boat. Wilcox, Crittenden & Co., Middletown, Conn.
25209. Series of common wrought-iron rudder-braces. " "
25189. Series of rudder braces. " "
25210. Rudder-braces for New Orleans cat-boat. " "
25183. Rudder-braces for metallic life-boat. " "
29472. Dory breast-hook and stern braces. " "

Cleats.

25779. Stay-sail snatch-cleat. Used by Gloucester fishing-schooners. Allen L. McDonald, Gloucester, Mass.
25809. Wooden cleats. Used to fasten ropes to. William Coleman & Sons, Providence, R. I.
25218. Series of small cleats. Wilcox, Crittenden & Co., Middletown, Conn.
25217. Small brass cleats. " "
25177. Cleats for Cape Ann seine-boat. " "
25191. Boat-cleats. " "

Rowlocks.

25088. Whale-boat rowlock. Wilcox, Crittenden & Co., Middletown, Conn.
25086. Brass wash-streak rowlock. " "
25113. Steering rowlock with stem socket for Cape Ann seine-boat. Wilcox, Crittenden & Co., Middletown, Conn.
25114. Socket used on side of stern for steering. Used on Cape Ann seine-boat. Wilcox, Crittenden & Co., Middletown, Conn.
25085. Seine-boat rowlock. Wilcox, Crittenden & Co., Middletown, Conn.
25070–72. Polished brass rowlocks. " "
25076, 25077. Polished brass rowlock used on gunning-skiff. Wilcox, Crittenden & Co., Middletown, Conn.
25104–5 Galvanized socket rowlocks. Wilcox, Crittenden & Co., Middletown, Conn.
25082–3–4. Brass socket rowlocks. " "
25091–2–3. Plain brass patent swivel rowlock. " "
25094. Galvanized-iron patent swivel rowlock. " "
25101. First patent swivel rowlock put in market. Wilcox, Crittenden & Co., Middletown, Conn.
25079–80–81. Plain brass rowlock used on gunning-skiff. Wilcox, Crittenden & Co., Middletown, Conn.
25106–7–8. Side-plate rowlock used on gunning-skiff. Wilcox, Crittenden & Co., Middletown, Conn.

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Rowlocks.

25188. Rowlock for dory. Showing new mode of fastening. Wilcox, Crittenden & Co., Middletown, Conn.

25765. Dory thole-pin rowlock. Samuel Elwell, jr., Gloucester, Mass.

25090. Gun-metal dory rowlock with Southwick's patent fastening. Wilcox, Crittenden & Co., Middletown, Conn.

25100. Dory rowlock, showing patent mode of fastening. Wilcox, Crittenden & Co., Middletown, Conn.

26902. "Lyman's patent bow-facing rowing-gear." William Lyman, Middlefield, Conn.

This bow-facing, *i. e.*, front view, rowing-gear is an invention which allows the rower to face forward instead of backward, pulling in the same manner as with the ordinary oars. This reverse movement is obtained by having the oar in two parts, each part having a ball-and-socket joint, which is attached to the wale of the boat by means of a slot and button, and the two parts connected by a rod (with hinged bearings) which crosses the wale of the boat.

The advantages claimed for this rowing-gear over the ordinary oar, are:

"1. *The oarsman faces the direction in which he goes.*

2. The arrangement of the levers is such that the oarsman applies his strength to the best mechanical advantage, enabling him to row faster and more easily than with any other oar.

3. During the stroke the bow of the boat is slightly raised by the motion of the rower instead of being lowered by his motion as in ordinary rowing.

4. The stroke is longer than with ordinary oars.

5. The oars can be closed up out of the way along the side of the boat without detaching them from the gunwale.

6. It is better from the fact that the blade of the oar is in front and can be *seen* at the beginning of the stroke, so that there is no difficulty in avoiding obstacles, and in a rough sea there is little danger of "catching crabs."

7. With these oars the boatman makes no more effort in steering than in directing his course while walking, and this advantage lessens greatly the effort of rowing.

8. While rowing there is no noise from the bearings.

9. A pair of these oars weigh about 5 pounds more than the oars, but this additional weight has this advantage, that at the beginning and end of the stroke it helps to lower and raise the blade owing to the peculiar position of the oar.

10. When these oars are detached from the boat, no wood or iron projections are left on the wale of the boat, as in ordinary rowing-gear, and thus a serious inconvenience is obviated.

These oars can be attached to and detached from the boat very quickly and they can be closed up in a convenient form for carrying.

These several advantages, viz, *the front view*, the increased ease and speed in rowing, the raising of the bow instead of depressing it, the closing up of the oar out of the way while on the boat, the increasd facility in avoiding obstacles, the diminished effort of hand and eyes in steering, the rowing without noise, the better balance and swing of the oars, have commended this new gear to all who have tried it.

This gear can be attached to almost any boat, and is especially adapted to hunting, fishing, and all kinds of pleasure boating.

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Rowlocks.

Almost any one (even if he has never rowed a boat) with an hour's practice can use these front view oars well; it being much easier to learn to use a pair of these oars than a pair of the back view oars." (William Lyman.)

28292. Frederick D. Graves's improved noiseless rowlock. Fred. D. Graves, Boston, Mass.

"The object of this invention is to improve the construction and operation of the class of rowlocks in such manner as, first, to insure the proper inclination of the blade of the oar, and prevent the liability of its catching the water when feathering in recovering, as well as to insure the proper position of the blade of the oar when making the stroke; secondly, to enable the outer end of the oar to be raised when it is being feathered, in order to prevent its contact with the water in rough weather. My improved rowlock, which is composed of an inclosing ring located on a pintle, and an inner ring inclosed by the ring and adapted to be partially rotated therein; the inside of the inclosing ring is provided with a groove which extends almost around it, its continuity being broken only by a stop. The pintle of the rowlock is inserted in a socket attached to the gunwale of the boat, the pintle and rowlock being adapted to turn freely in the socket. From the foregoing it will readily be seen that an oar pivoted in the inner ring is adapted to be partially rotated, in addition to its oscillating movements, so that when its stroke is completed it can be turned, so as to feather the blade in the recover stroke. The stop and shoulders of the inner ring are arranged in such mutual relation that the shoulder abuts against the stop, in feathering the oar, before the blade becomes horizontal in cross-section, so that the cross-section of the oar is necessarily inclined downward from its forward to its rear edge during the feathering stroke, this inclination of the blade preventing its forward edge from engaging with the water and overturning the rower, or, in other words, causing him to "catch a crab." This limitation of the oar in its rotation prevents awkward accidents in feathering, and enables an unskilled person to row with a considerable degree of certainty." (F. D. Graves.)

25098–9. Galvanized-iron patent swivel rowlock. Wilcox, Crittenden & Co., Middletown, Conn.

25095. Galvanized-iron patent swivel rowlock. " "

25097. Galvanized-iron patent swivel rowlock. " "

25096. Galvanized-iron patent swivel rowlock. " "

25073–4–5. Polished brass patent swivel rowlock. " "

25102–3. Galvanized socket rowlock. " "

25111. Countersunk rowlock. Used on Ohio River flat-boats. Wilcox, Crittenden & Co., Middletown, Conn.

29459. Rowlock. Newport and Providence River style. Wilcox, Crittenden & Co., Middletown, Conn.

25087. North River pattern rowlock. " "

25089. East River pattern rowlock. " "

29319. Socket-joint rowlock. Frederick A. Gower, Providence, R. I.

"The socket-joint rowlock is intended to increase the speed and improve the convenience of racing boats. Its advantages have proved so easily apparent to oarsmen that there is little need of detailing its strong points, but the following are among its leading features:

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Wabbling of the oar is wholly avoided. If the oar is a properly good fit, it will have less than ¼ inch of fore-and-aft motion in the lock.

"Catching crabs" is largely avoided by preventing the oar from jamming in the lock at the beginning or end of the stroke. If a "crab" should be caught, the rowlock is not strained, and the oar can be recovered without stopping the boat.

A good grip of the water is assured to even the inexperienced oarsman by the shape of the back of the rowlock, which corresponds to that of the oar. The oar settles itself into the proper position on beginning the stroke.

Any length of reach may be taken by long-built men in going forward, avoiding an evil often complained of.

A space half as wide admits passage of the boat. Equipped with this rowlock a six or four oared shell passes through an opening the width of the outriggers. Crews rowing on narrow or bridged water will find this advantage worth the price of the rowlocks in a single season.

Uniting the rods at a single point brings the whole strength of the outrigger into play at every part of the stroke, and an outrigger thus made can hardly be demolished while the boat stands.

Any oars may be used if of recent pattern, *i. e.*, without the unsightly "bulge" on the loom. It is only necessary to make a slight change in the button, as described below.

Better time may be made. Experiments thus far indicate that the socket-joint rowlock is perceptibly speedier than the common pattern, by the stoppage of wabbling, and general smoothness of action.

Raising a rowlock with the common outrigger is a half hour's trouble with rusty nuts (one or two of which usually twist the bolt off in starting) and experimenting to get the right thickness of washers. With the socket-joint rowlock the same thing is done in two minutes by slipping half or three-quarters of an inch of washers on the shaft under the top rod.

Superior strength. The ordinary iron thole-pins are strong in one direction only; a backward or sidewise blow is likely to bend them. The supporting shaft of the socket-joint rowlock is equally strong all around and withstands a greater strain than the best oars made can apply to it. The whole rowlock is made of the best bronze-metal, which will not rust nor suddenly snap on a frosty morning. Under great mechanical pressure the lower part of the lock has been bent out nearly straight without breaking.

Minor conveniences continually appear in the use of this improvement. There is no wiring to do; no reaching out-board to ship oars; no wriggling the button through the rowlock; no getting grease on the oar-handle by passing through the rowlock; no "losing the button" outside the outrigger; no jamming the button between the thole-pins. When the outriggers are taken off the boat the rods turn on the shaft as a hinge and fold up into a compact bundle not easily bent out of shape nor injured. The rowlocks can be detached entirely, if desired, and each set of rods made into a package as easily carried as a walking-stick, while the rowlock may be put into the oarsman's coat-pocket. Oarsmen having occasion to travel with boats by rail will appreciate this convenience.

This rowlock cannot pretend to be a cheap contrivance; it is made of the best material, and requires expensive labor. Its first cost is more than that of the common pattern, but considering its advantages it will be found cheaper in the end." (F. A. Grower.)

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Rowlocks.

25185. Thole-pins for metallic life-boat. Wilcox, Crittenden & Co., Middletown, Conn.
25115. Whitehall pattern rowlock. " "
25112. Detroit or Lake Michigan rowlock. " "
22227. "Acme" oarlock. Pattern invented 1876. " "
25172. Oar-holder for Cape Ann seine-boat (old model). Higgins & Gifford, Gloucester, Mass.
25171. Oar-holder for Cape Ann seine-boat. Wilcox, Crittenden & Co., Middletown, Conn.

Oars.

25022. One pair white-ash oars (9 feet). R. T. Dodge, maker, Boston, Mass.
25021. One pair white-ash oars (6 feet). " "
25041. Pair white-ash oars (12 feet). " "
25011. Pair pine oars (8 feet). " "
25023. Pair white-ash oars (9 feet). " "
25012. Pair spoon oars (10 feet). " "
26811. Pair of oars (7 feet 8 inches). Waters & Son, Troy, N. Y., makers; Delong & Sons, Glens Falls, N. Y.

Paddles.

25020. White-ash paddles. R. T. Dodge, maker, Boston.
643. Indian paddles. Northwestern coast. George Gibbs.
644. Indian paddles. " "
645. Indian paddles. " Cape Flattery. George Gibbs.
646. Indian paddles. " Whaling. "
1790. Indian paddles. "
1791. Indian paddles. "
14284. Indian paddles. "
14285. Indian paddles. "
11471. Indian paddles. Fort Townsend, W. T. J. G. Swan.
11473. Indian paddles. " "
11474. Indian paddles. " "
11363. Indian paddles (for skin canoe used by Aleutians). Alaska. V. Colyer.
11369. Indian paddles (for skin or wooden canoe). " "
11366. Indian paddles. " " "
20902. } Indian paddles (used by Trimsein Indians). Fort Simpson, B. C.
20903. } J. G. Swan.
11434. Indian paddles. Passamaquoddy Indians, Eastport, Me. E. Palmer.
2652. Indian paddles. Northwestern coast. Exploring Expedition. Lieut. Wilkes, U. S. N.
2652. Indian paddles. Northwestern coast. Exploring Expedition. Lieut. Wilkes, U. S. N.
26783. Whaling paddle. Makah Indians, Neeah Bay. J. G. Swan.
26781. Whaling paddle. " "
26782. Whaling paddle. " "
26780. Whaling paddle. " "
26779. Whaling paddle. " "
26778. Whaling paddle. " "
26777. Whaling paddle. " "
26776. Whaling paddle. " "

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Paddles.

26775. Whaling paddle. Makah Indians, Neeah Bay. J. G. Swan.
26774. Whaling paddle. " "
26773. Canoe paddle. " "
26772. Canoe paddle. " "
26771. Canoe paddle. " "
26770. Canoe paddle. " "
26769. Canoe paddle. " "
26768. Canoe paddle. " "
26767. Canoe paddle. " "
26766. Canoe paddle. " "
26765. Canoe paddle. " "
26764. Canoe paddle. " "
26810. Double paddle. Made by Waters & Son, Troy, N. Y.; De Long & Sons, Glens Falls, N. Y.

Poles and pushing sticks.

15653. Bidarka pole. Nunivak, Alaska. W. H. Dall.
15653. Bidarka pole. " "
17443. Bidarka pole. Cave, Kagamil Island, Alaska. Alaska Commercial Company.

Candlestick.

Used in hold of vessel while storing fish.

32741. Candlestick. A. McCurdy, Gloucester, Mass.
32692. Candlestick or "Sticking Tommy." Gloucester, Mass. G. Brown Goode.

Fog-horns.

29382. Series of common reed fog-horns, Nos. 1, 2, 3, and 4. Wilcox, Crittenden & Co., Middletown, Conn.
25783. Grand Bank fog-horn. Called by the fishermen "lipper" or "ripper." William H. Weston, Provincetown, Mass.
25281. The Anderson fog-horn. U. S. Fish Commission. (Deposited.)

Deck-scrapers.

25160. Series of ships' deck scrapers. Wilcox, Crittenden & Co., Middletown, Conn.

Dory scoop.

25222. Dory scoop. S. Elwell, jr., Gloucester, Mass.

Flagging irons, &c.

Used by mackerelmen of Capes Cod and Ann to separate barrel staves for the insertion of stems of flag to stop leakage.

29492–94. Flagging iron, hoop-drivers, and adze. M. W. Grant, Wellfleet, Mass.

Pump-bolt or toggle-pin.

Used on fishing-vessels of Cape Cod and Cape Ann.

29470. Pump-bolt or toggle-pin. Wilcox, Crittenden & Co., Middletown, Conn.

Apparatus accessory to rigging fishing-vessels.

Pump box and haft for seine-boat.

29497. Pump box and haft for seine-boat. Andrew Kennedy, Provincetown, Mass.
29499. Pump box and haft for seine-boat. " "

Bung-bucket or "water-thief."

25784. Bung-bucket or "water-thief." Wm. H. H. Weston, Provincetown, Mass.

Devil's claw.

Used to stop the chain when the windlass is wanted for other uses.

29442. Devil's claw. W. H. Hesbolt, Provincetown, Mass.

Box hook.

Used in closing boxes packed full of fish.

32680. Bilge hooks. Gloucester, Mass. G. Brown Goode.
32695. Box hook or "devil's claw." Gloucester, Mass. G. Brown Goode.

Barrel-lifters.

Used for stowing away mackerel-kegs in holds of vessels.

29291. Barrel-lifters. Wilcox, Crittenden & Co., Middletown, Conn.
32679. Chime barrel-hooks. Gloucester, Mass. G. Brown Goode.

Ice-hooks.

For lifting ice on vessel from wharf.
32674. Ice-hooks. Gloucester, Mass. G. Brown Goode.

Lance-hooks.

Fastened on side of whale-boat to hang lance on.

25919. Lance-hooks. E. B. & F. Macy, New Bedford, Mass.

Grappling gear.

Used to recover lost trawls.

25936. Grappling gear. A. McCurdy, Gloucester, Mass.

Marline spikes.

29418. Marline spike or pricker. Used for splicing trawl-lines. Wilcox, Crittenden & Co., Middletown, Conn.
29455. Marline spike. Made from the jawbone of sperm whale. Robert D. Baxter, Provincetown, Mass.
29419. Marline spike. Made from the jawbone of whale. Frank O. Blake, Portland, Me.
25147. Sailmakers' marline spike. Wilcox, Crittenden & Co., Middletown, Conn.
25148. Sailmakers' marline pricker. " "
25164. Series of marline spikes. " "
25778. Fishermen's marline spike or trawl-line splicer. Alex. McCurdy, East Gloucester, Mass.

Apparatus accessory to rigging fishing-vessels.

Marline spikes.

25146. Series of hickory hand fids. Wilcox, Crittenden & Co., Middletown, Conn.
25672. Copper marline spike. Made at sea by Thomas Freeman. Used for splicing trawl-lines. Sanford Freeman, Norwichport, Mass.
32693. Splicer. Gloucester, Mass. G. Brown Goode.

Rest for harpoon, &c.

11392. Rest for harpoon and bow and arrow. Aleutian Island. Vincent Colyer.
Used on deck of kyak.

Stretchers for kyak-line.

9836. Stretchers for kyak-line. Eskimos.

Stool.

3978. Stool. R. MacFarlane.
Used by Eskimos to stand on while watching for seal in water.

49. CAMP-OUTFIT.

Shelter.

Lodges.
Tents.
Hunting-camps.
Hunters' houses.
Fishing-houses.

Furniture.

Hammocks.
Beds, couches, stretchers, and lounges.
Blankets (rubber and mackinaw), and fur robes.
Fuel.
Apparatus for kindling fire.
Lamps and lanterns.
Tools.

Commissary supplies.

Cooking apparatus, kettles, and stoves.
Commissary supplies.

29295. Portable camp-stove. H. L. Duncklee, Boston, Mass.
25689. Portable camp-stove. " "
Open, showing utensils, viz:
25690. Six tin plates.
25691. Six tin cups.
25692. Six-quart kettle.
25693. Eight-quart kettle.
25694. Stew-pan.

Commissary supplies.

Commissary supplies.

25695. Coffee-pot.
25696. Dipper.
25697. Toast-rack.
25698. Frying-pan.
25699. Bread-pan.
F. & S. 60. Camp-stove and utensils. Property of John A. Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.
26673. Coffee-heater. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.
26713. Camp-stove. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.
26843. Lehmen's patent folding camp-baker. Scoville & Johnson, Marquette, Mich.

Table-furniture.

Preserved meats, &c.

Canned meats.

24917. Fresh tomato soup. Wm. Underwood & Co., Boston, Mass.
26649. Ox-tail soup (star brand). Portland Packing Company, Portland, Me.
24913. Fresh soup and bouilli. Wm. Underwood & Co., Boston, Mass.
26648. Soup and bouilli (star brand). Portland Packing Company, Portland, Me.
24921. Mock-turtle soup. Wm. Underwood & Co., Boston, Mass.
26641. Cumberland potted sausage (star brand). Portland Packing Company, Portland, Me.
24927. Ox-tail soup. Wm. Underwood & Co., Boston, Mass.
24929. Original deviled ragout. " "
24928. Deviled tongue. " "
24930. Deviled ham. " "
26645. Cumberland roast mutton (star brand). Portland Packing Company, Portland, Me.
24920. Fresh chicken. Wm. Underwood & Co., Boston, Mass.
26640. Cumberland roast chicken (star brand). Portland Packing Company, Portland, Me.
24931. Deviled chicken. Wm. Underwood & Co., Boston, Mass.
26646. Cumberland roast veal (star brand). Portland Packing Company, Portland, Me.
24916. Fresh mutton. Wm. Underwood & Co., Boston, Mass.
26647. Cumberland roast beef (star brand). Portland Packing Company, Portland, Me.
24910. Beef à la mode. Wm. Underwood & Co., Boston, Mass.
24911. Fresh mince-meat. " "
24915. Fresh veal. " "
26639. Champion shell-beans (star brand). Portland Packing Company, [Portland, Me.
26638. Portland blueberries (star brand). " "
22238. Fresh blueberries. Castine Packing Company, Castine, Me.
24919. Fresh beef. Wm. Underwood & Company, Boston, Mass.
26637. Yarmouth sugar-corn. (Patented April 8, May 13 and 20, and August 26, 1862.) (Star brand.) Portland Packing Company, Portland, Me.

Commissary supplies.

Canned meats.

26652. Yarmouth succotash. Made from Yarmouth sugar-corn and champion shell-beans (star brand). Portland Packing Company, Portland, Me.

50. PERSONAL EQUIPMENTS.

Clothing.

Hunting suits.

26355. Canvas hunting-coat. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.

23658. Fur vest. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.

26659. Buckskin coat. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.

26670. Mole-skin pants. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.

26671. Corduroy hunter's coat. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.

26675. Corduroy hunter's pants. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.

26676. Corduroy vest. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.

26701. Chamois shirt. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.

26594. Hunter's water-proof suit, with patent cartridge-holding vest. Geo. C. Henning, Washington, D. C.

This suit includes:

1. Pantaloons so made that they can be folded close to the legs.
2. Gaiters.
3. Vest with sleeves.
4. Reversible shooting-coat, with seventy-six receptacles for shell or cartridges so arranged as to permit them to be carried either end up, and secured from loss or from injury by rain, by means of the flaps which button over them. The coat is of the same shape before and behind, so that when the hunter exhausts his shells in front he can reverse the coat and have a fresh supply. There are eight pockets opening on the outside of the skirt, and two large game pockets on the inside arranged with openings in the bottoms for ventilation and drip.
5. A double-visored cap.

26710. Hunting-coat. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.

Water-proof suits.

26656. Rubber hunting-coat. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.

Oil-skin suit.

29543. Cape Ann coats. J. F. Carter, Gloucester, Mass.

29544. Cape Ann pants. " "

Clothing.

Boots, moccasins, leggings.

26015. Fishermen's red cod boots. Jonathan Buck, Harwich, Mass.
26015. Fishermen's red-leather slippers. " "
26014. Fishermen's black boots. " "
25823. Slippers made of sheep-skin, with the wool on the inner surface. Worn by fishermen inside of their boots. A. R. Crittenden, Middletown, Conn.
26671. Boot-packings. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.
26672. Moccasins. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.
26708. Rubber boots. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.

Hats and caps.

25722. Fisherman's cap, called "Russian cap." E. R. Cook, Provincetown, Mass.
26651. Hunter's rubber cap. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.
29542. Series of sou'westers and oil-cloth hats (Cape Ann pattern). J. F. Carter, Gloucester, Mass.

Clothing for the hands.

25788. Pair of mittens. Called "Newfoundland cuffs" by fishermen. Peculiar to Gloucester. A. R. Crittenden, Middletown, Conn.
25790. Mackerel cots. Used on the fingers when taking mackerel by hook and line. Capt. Samuel Elwell, Gloucester, Mass.
25787. Pair of "hand-haulers." Used by fishermen off the Newfoundland Banks. Joseph Parsons, jr., East Gloucester, Mass.
25789. Pair of nippers; peculiar to Gloucester, Mass. Joseph Parsons, East Gloucester, Mass.
25718. Pair of nippers. Used by fishermen to protect the fingers while hauling in trawls. David Conwell.
25717. Pair of nippers. Central Wharf Company, Provincetown, Mass.
26709. Rubber gloves. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.

Protection from insects:

Nets for beds and for face.

26700. Mosquito-net. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.

Ointments (such as tar and sweet-oil).

Smudges (such as pyrethrum powder).

Shields, breastplates, and defensive armor.

Trappings.

Belts.

26665. Belt for sheath-knife. J. A. Nichols, Syracuse, N. Y.

Trappings.

Cross-belts.

Game-bags.

26667. Game-bag. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.
2523. Game-bag. Indians of Northwest coast. U. S. Exploring Expedition.
1473. Game-bag. Comanche Indians. Lieut. D. N. Couch, U. S. A.
2023. Game-bag of knit leather thongs. Dog-rib Indians. Fort Simpson, B. C. R. R. Ross.
2047. Hunting-bag of "babiche." Fort Simpson, H. B. T. R. R. Ross.
2020. Hunting-bag made of "babiche." Dog-rib Indians. Fort Simpson, H. B. T. R. R. Ross.
2551. Hunting-bag of "babiche." Fort Rae Eskimos. Mackenzie's River district. Stratton Jones.
2498. Game-bag. Indians of Northwest coast. U. S. Exploring Expedition.

Wrist-guards.

6927. Wrist-guard. Used in shooting with the bow. Kiowa Indians. Fort Cobb, I. T. E. Palmer.
5520. Wrist-guard. Apache Indians. Arizona. E. Palmer.

Optical instruments, &c.

Snow-goggles.

1651. Snow-blind. Anderson River Eskimos. R. MacFarlane.
10292. Snow-goggles.
1650, 2147, 2157. Snow-goggles. Anderson River Eskimos. R. MacFarlane.
5589. Ingaleet Eskimos. Yukon River, Alaska. W. H. Dall.
5579. Mahlemut Eskimos. Lower Yukon, Alaska. "
10200. Snow-goggles.

Telescopes.

Field-glasses, &c.

Water-telescopes.

26884. Water-telescope. U. S. Fish Commission. Used in examination of submarine objects.

Compasses.

26682. Hunter's compass. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.

Scales.

26681. Scales. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.

Game and fish baskets and slings.

Wallets for lines and other tackle.

Medical outfit.

Medicine-chests.
Hunter's and fishermen's flasks.

26684. Flasks. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest & Stream Publishing Company.

Artificial lights.

Lanterns for camp and ship use.[1]
Torches.

[1] See under *Sight decoys* above, p. 141.

SECTION C.

METHODS OF PREPARATION.

I. PREPARATION AND PRESERVATION OF FOOD.

1. PRESERVATION DURING LIFE (see under E, 3).
2. PRESERVATION OF FRESH MEATS.

Refrigerators.

Ice-boxes and refrigerators.

——. Allegretti iceberg-refrigerator. Allegretti Refrigerator Company, [New York.

——. Allegretti refrigerator show-case. " "

Banta refrigerator.

Banta horizontal refrigerator.

——. Banta refrigerator show-case. Process patented July 1, 1867. G. A. Banta, New York City.

——. Zero refrigerator. Alexander M. Lesley, New York.

Refrigerator-cars.

(Accessory.) The ice-trade:

Ice cutting and handling apparatus.

Methods of manufacturing artificial ice.

Ice-houses.

Other accessories of preservation.

Meat-hooks.

Skewers, &c.

Carving-tools.

3. PRESERVATION BY DRYING.

Sun-drying apparatus.

Beach dryers.

Flake-drying:

Newfoundland flakes.

Massachusetts flakes.

12495. Codfish-flake (with covers). Model. Coast of Maine. E. Skillings, Portland, Me.

Smoke-drying apparatus.

Herring smoke-houses.

12105. Model of smoke-house used in preparation of herring (*Clupea harengus*). Lubec, Me. U. S. Fish Commission.

12105½. Model of smoke-house used in preparation of salmon (*Salmo salar*). Lubec, Me. U. S. Fish Commission.

Halibut smoke-houses.

Sturgeon smoke-houses.

Aboriginal drying-houses.

Methods of drying haliotis, used by the Indians of California.

4. PRESERVATION BY CANNING AND PICKLING.

Salting fish.

Knives (see under B, 2).

Scaling apparatus.

26039. Kelsey & Hosmer's fish-dresser. Sandusky, Ohio. Patented Sept. 15, 1873. Kelsey & Hosmer, Sandusky, Ohio.

Tables, tubs, &c.

Barrels.

25750. Model of D. D. Parmalee's Waukegan fishery. J. W. Milner.
This model shows in miniature all the apparatus employed in cleaning and salting down the lake whitefish.

(Accessory.) Salt:

Specimens of the salts used in preserving fish.

Model of salt-mills used on Cape Cod in former days.

Extensively used in the first half of the present century in obtaining salt by evaporation of sea-water. Their remains are found on Cape Cod and Nantucket.

25706. Model of salt-works. Nantucket, Mass. W. H. Chase, 2d.

Canning meats.

Model of salmon-canning establishment.

Model of sardine-factory.

(Accessory.) Cotton-oil, and its manufacture.

Model of lobster-canning factory.

26583. Model of Johnson & Young's lobster-house. Warren bridge, near Fitchburg depot. Johnson & Young, Boston, Mass.
This model shows the factory with its vats for steaming the lobsters, the wharf, and the derricks used in handling the lobsters. It is accompanied by models of lobster-smack, and of the principal forms of lobster-nets; catalogued elsewhere.

Model of oyster-canning factory.

5. PREPARATION OF BAITS.

Bait-mills, knives, choppers, &c. (see, also, under B, 2 and 3).

26011. Voss' improved bait-mill. (Patented January 17, 1876.) A. Voss, Gloucester, Mass.

Bait-tubs, vats, &c.

II. MANUFACTURE OF TEXTILE, FABRICS, FELTS, AND STUFFINGS.

6. PREPARATION OF WOOL AND HAIR OF MAMMALS.

Preparation of wool cloths.

Washing.
Shearing.
Stapling or assorting.
Scouring.
Combing, carding, and plucking.
Spinning and reeling.
Weaving.
Fulling and teazling.
Cropping.
Pressing.

Weaving worsted cloths.

Felting and the hat manufacture.

Bowing.
Pressing.
Stopping.
Rolling off.
Shaping.

Preparation of curled hair for stuffings.

7. PREPARATION OF WHALEBONE.

Preparation of stuffings.

8. PREPARATION OF FEATHERS.

Preparation of down for stuffings.

Preparation of feather fabrics.

Preparation of "brillantine."

Preparation of, or flocking for wall-paper, from refuse quills.

Preparation of fibers for manufacture of plush carpets.

9. PREPARATION OF SILK OF INSECTS.

Preparation of silk of silk-worms.

Boiling the cocoons.
Reeling.
Spinning.
Dyeing.
Weaving.

10. PREPARATION OF SOFT PARTS OF OTHER INVERTEBRATES.

Preparation of silk from byssus of Pinna.

Preparation of sponge stuffing.

III. PREPARATION OF THE SKIN AND ITS APPENDAGES.

11. CURRYING OF LEATHER.

Processes of currying.

Dipping.
Graining.
Scraping.
Dressing.

Implements employed by curriers.

"Head-knives."
"Pommels."
"Stretching-irons."
"Round-knives."
"Cleaners."
"Maces."
"Horses" or trestles.
"Dressers."
"Treading-hurdles."

Eskimo and Indian currying methods and implements.

Methods of dressing gut and sinew.

12. LEATHER DRESSING.

Processes of tanning leather.

Soaking.
Liming.
Tanning.

Processes of tawing or oil-dressing leather.

Soaking.
Liming.
Oiling.

Apparatus of leather-dressing, recent and aboriginal.

13. FUR-DRESSING.

Processes of fur-dressing.

Currying. (See under 12.)
Scouring.
Tanning.
Lustering.
Plucking and dyeing.

14. FEATHER-DRESSING.

Method of preparing ornamental feathers.

Scouring.
Bleaching.
Washing.
Azuring.
Sulphuring.
Scraping.
Dyeing.

(Art of plumagery.)

15. MANUFACTURE OF QUILL ARTICLES.

Manufacture of quills for pens.

Sand-bath drying and steaming.
Polishing.
Dyeing.
Shaping.

Manufacture of tooth-picks.

Manufacture of floats and other articles.

Manufacture of quill brush-bristles.

16. HAIR AND WOOL WORK.

VI. PREPARATION OF HARD TISSUES.

17. IVORY CUTTING AND CARVING.

Manufacture of handles, trinkets, billiard-balls, &c.

Turning and sawing.
Polishing.
Bleaching.

Manufacture of organ and piano keys.

Sawing.
Strip-sawing.
Polishing.
Bleaching. &c.

Other processes.

18. PREPARATION OF HORN AND HOOF.[1]

Steaming.[1]

Pressing.[1]

19. PREPARATION OF WHALEBONE.[1]

Cutting and other processes.[1]

Manufacture of whip-makers' stock and whips.

Manufacture of umbrella-makers' bone.

Manufacture of ribbon-weavers' bone.

Manufacture of hat and bonnet makers' bone.

Manufacture of suspender-makers' bone.

Manufacture of stock-makers' bone.

Manufacture of dress and stay makers' bone.

Manufacture of billiard-table cushions.

Manufacture of surgical instruments.

Manufacture of whalebone brushes.

Manufacture of rosettes, woven work, and trinkets.

[1]These processes are illustrated in part by the specimens, showing the horn, whalebone, and tortoise-shell, in various stages of preparation, exhibited in Section D.

Other whalebone manufactures.

20. PREPARATION OF TORTOISE-SHELL.[1]

21. PREPARATION OF FISH-SCALE WORK.

22. PREPARATION OF NACRE.

23. PREPARATION OF CORAL.

24. PREPARATION OF OTHER HARD TISSUES.

V. OILS AND GELATINES.

25. EXTRACTION OF WHALE-OIL (WITH MODELS OF TRY-WORKS, CLARIFYING-VATS, ETC.).

Preparation of body-oil.

Cutting in and stowing
Leaning and mincing.
Trying.
Bailing.
Cooling.
Barreling.
Refining.

Preparation of head-oil.

Preparation of spermaceti.

Instruments and appliances of rendering whale-oil.

Boarding-knives.[2]
Leaning-knives.[2]
Mincing-horse and mincing-knives.
Mincing-tub.
Mincing-machine.
Blubber-fork.[3]

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[1] These processes are illustrated in part by the specimens, showing the horn, whalebone, and tortoise-shell, in various stages of preparation, exhibited in Section D.

[2] Arranged with the knives.

[3] Arranged with the hooks.

Instruments and appliances of rendering whale-oil.

Try-pots.

25013. Model of whaler's try-works. Capt. L. W. Howland, New Bedford, Mass.

This model is accompanied by miniature models of all the implements used in trying out the blubber, viz:

a. Fire-pike.
b. Stirring-pole.
c. Scrap-hopper.
d. Skimmer.
e. Bailer.
f. Cooler.
g. Deck-pot.
h. Casks.

26. EXTRACTION OF OTHER MAMMAL OILS.

27. EXTRACTION OF BIRD AND REPTILE OILS.

28. EXTRACTION OF FISH-OILS (WITH MODELS OF BOILERS, PRESSES, CLARIFYING-VATS, ETC.).

26899. Model of menhaden oil factory. Owned by Jos. Church & Co. Joseph Lawler, Bristol, Me.

The factory is the most elaborate of the sixty or more on the coast of New England and the Middle States, and is 160 feet in length by 40 in width.

29. EXTRACTION OF GLUE, GELATINE, AND ISINGLASS.

VI. DRUGS, PERFUMES, AND CHEMICAL PRODUCTS.

30. MANUFACTURE OF PERFUMES.

31. MANUFACTURE OF IVORY-BLACK.

32. MANUFACTURE OF PRUSSIATES.

33. MANUFACTURE OF MUREXIDES.

34. PREPARATION OF COCHINEAL COLORS.

35. MANUFACTURE OF INKS FROM ANIMAL SUBSTANCES.

36. PREPARATION OF ALBUMEN.

37. MANUFACTURE OF PEPSIN.

38. MANUFACTURE OF PHOSPHORUS.

39. MANUFACTURE OF SAL AMMONIAC.

40. MANUFACTURE OF AMMONIA.

41. MANUFACTURE OF ALBUMEN PREPARATIONS.

42. MANUFACTURE OF PROPYLAMINE.

43. MANUFACTURE OF FORMIC ACID.

44. MANUFACTURE OF CARBAZOTATES.

VII. MANUFACTURE OF FERTILIZERS.

45. PREPARATION OF GUANO.

Model of fish-guano works.

Grinders and pulverizers.
Mixers.

25822. Model of guano-mixer. Patented April 27, 1867. Poole and Hunt, Baltimore, Md.

This mixer is employed in the fish-guano works for the purpose of thoroughly mixing the fish-scrap with the mineral phosphates and sulphuric acid.

Guano in its various stages, with its ingredients, South Carolina phosphates, Navassa phosphates, scrap (crude and dried), sulphuric acid, kainite, screened and unscreened guano, and sea-weed used in preparation: a full series of these is exhibited in the case of Guanos.

VIII. LIMES.

46. BURNING OF LIME.

Models of kilns for burning shells.

IX. PRESERVATION OF THE ANIMAL FOR SCIENTIFIC USES.

47. APPARATUS FOR MAKING AND PRESERVING ALCOHOLIC SPECIMENS.

Tanks and jars.

Agassiz collecting-tank.
Army collecting-tank.
Museum storage-tank, Agassiz model.
Anatomical jars.
Self-sealing jars used in collecting.
Vials.

Syringes for injecting.

Inflatable bags.

Preservative mixtures.

Alcohol.
Glycerine.

Preservative mixtures.

Carbolic acid.
Chloral hydrate.
Picric acid.
Osmic acid.

Labels.

Metallic labels.
Parchment labels.
Indelible ink, pencils, &c.

48. APPARATUS FOR PRESERVING AND MAKING SKELETONS.

Preparation of the bones.

Macerating-vats.
Boiling-vats.
Cleaning and bleaching preparation.

Mounting of the bones.

Scraping-tools.
Articulating-tools.

49. APPARATUS FOR MAKING CASTS. MODELING.

Materials.

Clays.
Plasters.
Glues.
Papier-maché and *carton-pierre*.
Gelatine.
Paraffine.
Collodion.

This apparatus and material is in constant use by the assistants in the National Museum and the Fish Commission. It is thought scarcely necessary to exhibit it.

Frames and modeling tools.

Molds:

Of plaster.
Of gelatine.
Of paper.
Of paraffine.

50. APPARATUS AND METHODS OF MAKING AND MOUNTING SKINS. TAXIDERMY.

Tools.

Flaying-tools.
Scraping-tools.
Taxidermists' tools for stuffing:
  Forceps.
  Pliers.

Preservatives and insect-powders.

Arsenic and arsenical soap.
Corrosive sublimate.
Salt, alum, &c.
Persian insect-powder.
Tobacco, snuff, used as preservatives.

Frames, &c.

Wooden frames.
Wire frames.
Plaster model-bodies.

51. (ACCESSORY.) PHOTOGRAPHIC AND OTHER DELINEATING APPARATUS.

Photographic apparatus.

Lenses.
Cameras and fittings.
Camera tripods and stands, with model.
Fish Commission stands.

——. Model of Fish Commission camera-stand. U. S. Fish Commission. This stand is employed in taking photographs of large fishes. It enabling the photographer to operate his camera vertically.

Plates, and their results:
  Wet plates.
  Dry plates.
  Dark closets.

Camera-obscuras.

Mechanical delineators.

Methods of heliotyping and engraving illustrations.

SECTION D.

ANIMAL PRODUCTS AND THEIR APPLICATIONS.

I. FOODS.

1. Foods in a fresh condition.

This section includes specimens of the marketable animals in a fresh condition in refrigerators.

The following species of fish were exhibited in the Allegretti and Banta refrigerators in the Government building from May 10 to November 10, by Mr. E. G. Blackford, of New York City.

Fishes (eastern coast):

Rabbit-fish (*Tetrodon laevigatus*).
Bur-fish (*Chilomycterus geometricus*).
File-fish (*Balistes capriscus*).
Long-tailed file-fish (*Alutera cuspicauda*).
Orange file-fish (*Ceratacanthus aurantiacus*).
American sole (*Achirus lineatus*).
Flat-fish (*Pseudopleuronectes americanus*).
Flounder (*Chænopsetta ocellaris*).
Halibut (*Hippoglossus vulgaris*).
Pollack (*Pollachius carbonarius*).
Cod (*Gadus morrhua*).
Tom-cod or frost-fish (*Microgadus tomcodus*).
Haddock (*Melanogrammus æglefinus*).
Hake (*Phycis chuss*).
Striped sea-robin (*Prionotus evolans*).
Broad-fingered sea-robin (*Prionotus carolinus*).
Sea-raven (*Hemitripterus americanus*).
Wolf-fish (*Anarrhichas lupus*).
Tautog, or black-fish (*Tautoga onitis*), weight 22½ pounds.
Chogset or cunner (*Tautogolabrus adspersus*).
Parrot-fish (*Pseudoscarus* sp.).
Sergeant-major (*Glyphidodon saxatilis*).
Lump-fish (*Cyclopterus lumpus*).
Mackerel (*Scomber scombrus*).

Fishes (eastern coast):

Bonito (*Sarda pelamys*).
Spanish mackerel (*Cybium maculatum*).
Cero (*Cybium caballa*).
Striped cero (*Cybium regale*).
Crevalle (*Carangus hippos* and *Paratractus pisquetos*).
Pompano (*Trachynotus carolinus*).
Big-eyed scad (*Trachurops crumenophthalmus*).
South Carolina rudder-fish (*Seriola fasciata*).
Silver-fish (*Argyriosus vomer*, &c.).
Thread-fish (*Blepharis crinitus*).
Dolphin (*Coryphæna Sueuri* and *C. punctulata*).
Black rudder-fish (*Palinurichthys perciformis*).
Butter-fish (*Poronotus triacanthus*).
Short harvest-fish (*Peprilus Gardenii*).
Squirrel (*Holocentrum sogo*).
Squeteague (*Cynoscion regalis*).
Spotted squeteague or weak-fish (*Cynoscion carolinensis*).
Drum (*Pogonias chromis*).
Spot (*Liostomus obliquus*).
Red-fish, or spotted bass (*Sciaenops ocellatus*).
King-fish (*Menticirrus nebulosus*).
Croaker (*Micropogon undulatus*).
Sheeps-head (*Archosargus probatocephalus*).
Scuppaug, or porgy (*Stenotomus argyrops*).
Grunts (*Hæmylum arcuatum*, &c.).
Red snapper (*Lutjanus Blackfordii*).
Grouper (*Epinephelus striatus*, *E. apua*, &c.).
Sea bass (*Centropristis atrarius*).
Striped bass or rock fish (*Roccus lineatus*).
White perch (*Morone americana*).
Moon-fish (*Parephippus quadratus*).
Triple-tail (*Lobotes surinamensis*).
Bluefish (*Pomatomus saltatrix*).
Cobia (*Elacate canadus*).
Sucker-fish (*Leptechenеis naucrateoides*).
Striped mullet (*Mugil lineatus*).
Silver gar-fish (*Belone longirostris*).
Skipper (*Scomberesox scutellatus*).
Salmon (*Salmo salar*).
Tarpum (*Megalops thrissoides*).
Menhaden (*Brevoortia tyrannus*).
Shad (*Alosa sapidissima*).
Alewife, or gaspereau (*Pomolobus pseudoharengus*).
Tailor herring (*Pomolobus mediocris*).
Herring (*Clupea harengus*).

Fishes (eastern coast):

Mud shad (*Dorosoma Cepedianum*).
Sea cat-fish (*Aelurichthys marinus*).
Eel (*Anguilla bostoniensis*).
Sturgeon (*Acipenser oxyrhynchus* and *A. brevirostris*).
Spoonbill (*Polyodon folium*).
Ray, or skate (*Raia* sp.).
Spotted-fin shark (*Isogomphodon maculipinnis*).
Dog-fish (*Mustelus lævis*).

Fishes (fresh waters):

Burbot, or lawyer (*Lota maculosa*).
Fresh-water drum (*Haploidonotus grunniens*).
Small-mouthed black bass (*Micropterus salmoides*).
Large-mouthed black bass (*Micropterus pallidus*).
Rock bass (*Ambloplites rupestris*).
Sun-fish (*Pomotis aureus*).
Yellow perch (*Perca flavescens*).
Yellow pike-perch (*Stizostedium americanum*).
White bass, or striped bass (*Roccus chrysops*).
Lake pike (*Esox lucius*).
Masquallonge (*Esox nobilior*).
Pickerel (*Esox reticulatus*).
Brook trout (of eastern slope), (*Salvelmus fontinalis*).
Lake trout (*Salmo confinis*).
Salmon trout, or Mackinaw trout (*Cristivomer namaycush*).
Atlantic salmon (*Salmo salar*).
Sebago salmon (*Salmo salar* var. *sebago*).
White-fish (*Coregonus albus*).
Lake herring (*Argyrosomus harengus* and *A. clupeiformis*).
Michigan grayling (*Thymallus tricolor*).
Moon-eye (*Hyodon tergisus*).
Suckers (*Catostomus teres* and *Ptychostomus aureolus*).
Buffalo fish (*Bubalichthys bubalus*).
Shiner (*Stilbe americana*).
Catfishes (*Amiurus catus*, *A. nigricans*, &c.).

Fishes (western coast):

Salmon (*Salmo quinnat*).
Mussels.
Clams.
Crabs.
Lobsters.
Squid.

2. FOODS: DRIED AND SMOKED.

Mammal preparations.

Jerked bear-meat.

Jerked seal and walrus meat (Indian).

11435. Dried (jerked) flesh of harbor seal (*Phoca vitulina*). Prepared by the Passamaquoddy Indians. Eastport, Me. E. Palmer.

Jerked and smoked buffalo-meat.

14281. Dried (jerked) flesh of buffalo (*Bison americanus*), as prepared for hunters' use. Wyoming. F. V. Hayden, U. S. Geologist.

10917. Dried (jerked) flesh of buffalo (*Bison americanus*). Prepared by Sioux Indians. Army Medical Museum.

Dried and smoked beef.

Dried and smoked venison.

Hams of various kinds.

Jerked porpoise-meat (Indian).

11436. Dried (jerked) flesh of harbor porpoise (*Phocaena brachycion*). Prepared by the Passamaquoddy Indians of Eastern Maine. Eastport, Me. E. Palmer.

Jerked squirrels and other small mammals.

Pemmican.

12238. Pemmican of dried flesh of buffalo (*Bison americanus*), with buffalo-skin case. Prepared for hunters' use. Western Plains. Army Medical Museum.

Meat-biscuit, desiccated meat, meat extract (*extractum carnis*), desiccated and condensed milk, &c.

29524. Valentine's preparation of meat juice. M. L. Valentine, Richmond, Va.

29525. Valentine's meat juice and glycerine. (Meat juice 1 part, glycerine 3 parts.)

29358. Condensed milk. The Gail Borden Eagle brand (made in 1876). New York Condensed Milk Company, New York.

29360. Borden's pure cocoa (in combination with refined sugar and Borden's condensed milk). New York Condensed Milk Company, New York.

29359. Borden's meat-biscuit (made in 1851). Composed of pure juce or extract of beef combined with wheat-flour. New York Condensed Milk Company.

29361. Borden's extract of beef (made in 1876). Prepared by the Borden Meat Preserving Company, Colorado County, Texas. Concentrated *in vacuo*. New York Condensed Milk Company.

(Borden's extract of beef consists of the juices of lean meat concentrated *in vacuo* at a low degree of heat, by which process it is claimed the burnt taste and smell, objected to in other beef extracts, are avoided.)

4915. Condensed raw beef (pulverized). Prepared by the National Preserving Company, Baltimore.

Mammal preparations.

Sausages.

Cheese.

See in exhibition of Agricultural Department.

Bird preparations.

Jerked birds (Indian).

Reptile preparations.

Dried lizards (Indian).

Fish preparations.

Smoked halibut.

Dried cod, haddock, hake, &c.

26750. Alden's vapor-cured, snow-flaked, fresh codfish. E. G. Blackford.

Dried and smoked mullet and roes.

Dried and smoked garfish, flying-fish, &c.

Smoked herring, alewives, &c., and their roes.

12130. Smoked No. 1 herrings (*Clupea harengus*). Eastport, Me. D. T. Odell.

12131. Smoked "Magdalena" herrings (*Clupea harengus*). Eastport, Me. D. T. Odell.

12129. Smoked "scaled" herrings (*Clupea harengus*). Eastport, Me. D. T. Odell.

26552-3-4. Smoked herring (*Clupea harengus*). Eastport, Me. Griffin Bros.

Smoked salmon, oulachan, white-fish, smelt, &c., and their roes.

12121. Smoked white-fish (*Coregonus albus*). Lake Erie. Schacht & Bros., Sandusky, Ohio.

11608. Smoked flesh of the quinnat salmon (*Salmo quinnat*). Prepared by the McCloud River Indians. Shasta County, California. Livingston Stone.

12122. Smoked sturgeon (*Acipenser rubicundus*). Lake Erie. Schacht & Bros., Sandusky, Ohio.

19646. Dried flesh of trout (*Salmo*, sp.). Used as food by the Ahgy Pi-Ute Indians of Walker Lake, Nevada. Stephen Powers.

19353. Dried eggs of quinnat salmon (*Salmo quinnat*). Prepared by the McCloud River Indians. Shasta, Cal. Livingston Stone.

11049. Dried eggs of quinnat salmon (*Salmo quinnat*). Prepared for food by the Bannack Indians.

21716. Flour made from flesh of quinnat salmon (*Salmo quinnat*) by the McCloud River Indians of California. Livingston Stone.

21712. Basket of dried salmon (*Salmo quinnat*). Prepared for food by the McCloud River Indians. Shasta County, California. Livingston Stone.

25284. Dried flesh of salmon (*Salmo*, sp.). Prepared by the Sitka Indians of Alaska. Alaska. J. G. Swan.

12132. Dried flesh of the quinnat salmon (*Salmo quinnat*). Used as food by the McCloud River Indians. California. Livingston Stone.

Fish preparations.

13752. Dried eggs of quinnat salmon (*Salmo quinnat*). Used as food by the McCloud River Indians. California. Shasta County, California. Livingston Stone.

21187. Eggs of "herring" (sp. incog.). Used as food by Sitka Indians. Collected by them upon branches of hemlock (*Abies Mertensiana*), planted in shallow water, upon the spawning grounds of the fish. Sitka, Alaska. J. G. Swan.

Smoked sturgeon.

Veziga, prepared from the notochord of sturgeon.

Insects.

Dried grasshoppers (Indian).

25314. Grasshoppers. Dried for food by the Indians of Southern California. E. Palmer.

Worms.

Dried worms (Indian).

Mollusk preparations.

Dried abalones (*Haliotis*) prepared by the California Chinese.

Dried siphons of *Schizothærus* prepared by the Indians of the Northwest coast.

Dried slugs (*Limax*, &c.), used by Indians.

Radiate preparations.

(Dried holothurians, "bêches de mer," used by Chinese.)

Protozoans.

("Mountain meal," a kind of infusorial earth, mixed with flour, and used as food in Lapland and China.)

3. FOODS: SALTED, CANNED, AND PICKLED.

Mammal preparations.

Salted buffalo-meat.

Salted beef.[1]

Salted deer, reindeer, elk.

Salted tongues of beef, buffalo, deer, horse.[1]

Salted pork.[1]

Canned milk of the various brands.

[1] See above, p. 163.

Bird preparations.

Canned turkey.
Canned meats.

24918. Fresh turkey (*Meleagris gallopavo*). Wm. Underwood & Co., Boston, [Mass.
24932. Deviled turkey (*Meleagris gallopavo*). " "
26644. Cumberland roast turkey (star brand). Portland Packing Company, Portland, Me.

Canned chicken.
Canned goose.

Reptile preparations.

Salted and canned turtles and turtle soup.
Canned frogs.

26751. Alden fresh green turtle. Prepared by Alden Sea Food Company. Sold by Lynn Manufacturing Company, New York. Presented by E. G. Blackford, New York.

Fish preparations.

Salted halibut, halibut fins, &c.

25271. Preserved fresh halibut (*Hippoglossus vulgaris*). Wm. Underwood & Co., Boston, Mass.

Salted cod, cod's tongues, sounds, and roe.

24923. Fresh codfish (*Gadus morhua*). Wm. Underwood & Co., Boston, Mass.
25273. Fresh haddock (*Melanogrammus aeglefinus*). " "

Salted mackerel.
Salted Spanish mackerel.

26650. Fresh Seguin mackerel (star brand). Portland Packing Company, Portland, Me.
25855–60. Canned mackerel (*Scomber scombrus*). Kemp, Day & Co., New York.
24922. Fresh mackerel (*Scomber scombrus*). Wm. Underwood & Co., Boston, Mass.

Salted bluefish.
Salted pompano.
Salted sword-fish.
Salted mullets.
Salted salmon.

24924. Fresh salmon (*Salmo salar*). Wm. Underwood & Co., Boston, Mass.
26557. Pickled salmon (*Salmo*).
26755. Fresh Columbia River salmon. Brookfield, Columbia River, W. T. J. G. Megler & Co.
——. Canned salmon. A. Booth & Co., Chicago, Ill.

Fish preparations.

Salted salmon.

26756. Fresh Columbia River salmon. Brookfield, W. T. J. G. Megler & Co.
26757. Fresh Columbia River salmon. Brookfield, Columbia River, W. T. J. G. Megler & Co.
26803. Spring salmon bellies (salted). Oregon Packing Company, Portland, Oreg.
26747. Cook's Columbia River fresh salmon. Oregon Packing Company.

Canned menhaden, in oil, "American sardines."

16609. "American sardines." Prepared "à l'huile" from the menhaden (*Brevoortia tyrannus*). American Sardine Company, New York.
16702. Cornish sardines (à l'huile), first quality. Prepared by Fox & Fryer, Falmouth and Nevagissy, Cornwall, from the pilchard (*Clupea pilchardus*).
16680. "American boneless sardines." Prepared in olive oil from the menhaden (*Brevoortia tyrannus*). Process patented May 21, 1872. American Sardine Company, New York.
15516. "Shadines." Prepared from the menhaden (*Brevoortia tyrannus*). Port Monmouth Fishery, New York. Hooper & Coit, New York.

(Spiced lampreys) used in Europe.

Anchovy-sauce and "essence of anchovies."

Canned menhaden, in oil, "American club-fish."

Spiced menhaden, "ocean trout."

——. Ocean trout. Hoope & Coit, Port Monmouth, N. J.

Salted herring.

26748. Quoddy River herring (salted). Griffin Bros., Eastport, Me. Presented by E. G. Blackford, New York.

Salted anchovies.

26565–68 } "Krauter anchovies, Christiania." New York. Eagle Preserved
26571–72 } Fish Company.
26559. Anchovies.

Canned herring, in oil, "Russian sardines."

26562. Russian sardines.
26563–26570. "Russische Sardinen." Adler brand. Prima qualitat. "Reval." New York. Eagle Preserved Fish Company.

Caviare, prepared from roe of the various sturgeons.

12129. Caviare. Prepared from the eggs of the lake sturgeon (*Acipenser rubicundus*). Lake Erie. Schacht & Bros., Sandusky, Ohio.
26558. Caviare.
26635. American caviare. Max Ams, New York.
26634. Prime Russian caviare. (Patented Nov. 9, 1875.) H. Dittman, Hamburg. Max Ams, New York.

Fish preparations.

Pickled fish preparations.

26555. Pickled eels (*Anguilla bostoniensis*).
26633. American eels (pickled eels). **Max Ams, New York.**
26636. "Hamburger aale" (cans) (pickled eels). **Max Ams, New York.**
26630. "Hamburger aale" (pickled eels in jelly). **Max Ams, New York.**
26631. "Hamburger aale" (whole eels rolled and pickled with olives, capers, and mushrooms). **Max Ams, New York.**
26629. Hamburger aale (boxes). **Max Ams, New York.**
26632. Hamburger aale. G. Dittman, Hamburg. **Max Ams, New York.**

Extract of fish.

26749. Extract of fish. Made from the juices of the flesh of fishes (menhaden). S. L. Goodale, Saco, Me.

Preparations of mollusks.

Canned clams.
Canned Little Neck clams.
Canned scollops.
Cockles (*Cardium edule*), used in Europe as pickles and catsup.
See supplementary catalogue of Invertebrates.

4. GELATINES.

Mammal gelatines (see, also, under 24)

Gelatines made from tanners refuse and from sinews.
Gelatines made from feet and hoofs.
Gelatines made from bone and ivory shavings.

Bird gelatines.

(Nests of esculent swallows (*Calocalia esculenta, C. fuciphaga, C. indifica*, &c.), exported from Indian Archipelago to China.)

Fish gelatines or isinglass (see, also, under 24).

Insect gelatine.

Gelatine from cocoons of silk-worms.

5. BAITS AND FOODS FOR ANIMALS.

Prepared baits. (See under B, 45.)

Food for domesticated animals.

Oil-factory scraps.
Fish-scraps.
Cuttle-fish bone (see under 18).

II. CLOTHING.

6. FURS (embracing the furs in their rough state (peltries), and in the various stages of preparation; also the manufactured articles, such as robes, rugs, cloaks, sacks, tippets, cuffs, muffs, hats, caps, gloves, trimmings, and linings).

Mammal furs.

Puma (*Felis concolor*), used for carriage-robes, rugs, &c.

H. 67. Missouri. C. A. Herpich & Co.

Ocelot (*Felis pardalis*) used for rugs.

12509. Texas. Smithsonian Institution.

Jaguar (*Felis onca*), used for rugs.

——. Texas. Smithsonian Institution.

Cat (*Felis domestica*), used for robes and philosophical apparatus:
Black cat.
White cat.
Maltese cat.
Tortoise-shell cat.

H. 64. Natural. United States. C. A. Herpich & Co.
H. 65. Dyed brown. United States. C. A. Herpich & Co.

Canada lynx (*Lynx canadensis*), used for rugs and trimmings and dyed muffs, boas, &c.

24754. Labrador. G. R. Renfrew & Co., Quebec.

Bay lynx (*Lynx rufus*), used for rugs, and, when dyed, muffs and boas.

H. 61. Natural. Minnesota. C. A. Herpich & Co.
H. 62. Dyed brown. Kansas. "
H. 63. Dyed black. " "
H. 59. Dyed black. "
H. 60. Dyed brown. "

Eskimo dog (*Canis* sp.), used for rugs, &c.

24756. Labrador. G. R. Renfrew & Co., Quebec.

Wolf (*Canis lupus*), used for lining rugs and robes.

12508. Black variety.
H. 75. Gray variety. Kansas. C. A. Herpich & Co.
24753. Labrador. G. R. Renfrew & Co., Quebec.

Mammal furs.

Coyote or prairie-wolf (*Canis latrans*), used for rugs and robes.

H. 75. Colorado. C. A. Herpich & Co.
1014. Smithsonian Institution.

Red fox (*Vulpes fulvus*) used for robes.

24757. Labrador. G. R. Renfrew & Co., Quebec.
H. 34. Connecticut. C. A. Herpich & Co.
H. 35. Indiana. "
H. 3. Missouri. "

Silver fox (*Vulpes alopex*, var. *argentatus*), used for muffs and trimmings.

24759. Labrador. G. R. Renfrew & Co., Quebec.

Cross fox (*Vulpes alopex*, var. *decussatus*), used for robes and trimmings.

24758. Labrador. G. R. Renfrew & Co., Quebec.
H. 30. Montana. C. A. Herpich & Co.

Arctic fox (*Vulpes lagopus*).

24760. Labrador. G. R. Renfrew & Co., Quebec.
H. 29. White Arctic. C. A. Herpich & Co.
H. 28. Blue Labrador. "

Kit fox (*Vulpes velox*) used for robes, muffs, trimmings.

H. 37. Nebraska. C. A. Herpich & Co.

Gray fox (*Urocyon virginianus*), used for robes, rugs, and linings.

H. 32. Michigan. C. A. Herpich & Co.
H. 33. North Corolina. "

American or Hudson's Bay sable (*Mustela americana*), used for cloaks, muffs, cuffs, boas, linings, &c.

4393. Summer Arctic coast. B. R. Ross.
10176. Alaska. Lieut. F. M. Ring.
4389. Arctic coast, B. R. Ross.
460. Fort Boise, M. T. Dr. Geo. Suckley.
24764. Orange. Labrador. G. R. Renfrew & Co., Quebec.
24763. Silver. " " "
24762. Black. " " "
H. 25. Labrador. Smithsonian Institution.
H. 25. N. W. coast. " "
H. 26. Lake Superior. " "
H. 27. Maine. " "

Fisher or pekan (*Mustela Pennanti*) used for linings; tails used for trimmings.

3230. Fort Crook, Oreg. Capt. Gardiner.
1008. Fort Dalles, Oreg. Dr. Geo. Suckley.
2000. Steilacoom, Wash. "
1009. Fort Dalles, Oregon. "
24761. Black. Labrador. G. R. Renfrew & Co., Quebec.

Mammal furs.

Ermine or weasal (*Putorius erminea*) of northern hemisphere, used for cloaks, linings, &c.

24765. Labrador. G. R. Renfrew & Co., Quebec.
H. 39. (5 specimens.) United States. C. A. Herpich & Co.

Mink (*Putorius vison*), used for cloaks and muffs.

4395. Arctic coast. B. R. Ross.
350. California. Lt. Trowbridge.
3568. Puget Sound. Dr. Kennerly.
2387. Cape Flattery, Wash. Dr. Geo. Suckley.
24766. Brown. Labrador. G. R. Renfrew & Co., Quebec.
H. 18. New York. C. A. Herpich & Co.
H. 19. Minnesota. "
H. 20. Ohio. "
H. 22. Maine. "
H. 22. Missouri. "
H. 23. Florida. "

Wolverine (*Gulo luscus*), used for muffs, robes, linings.

24767. Labrador. G. R. Renfrew & Co., Quebec.
11339. Filmore, Utah. Lieut. Geo. M. Wheeler.
4379. Fort Simpson, H. B. T. Robt. Kennicott.

American badger (*Taxidea americana*), used for muffs and rugs.

26609. Southern Utah. U. S. Engineer Corps.
H. 70. United States. C. A. Herpich & Co.

Skunk, Alaska sable (*Mephitis mephitica*), used for muffs, boas, &c.

81. Washington, D. C. S. F. Baird.
H. 7. Black. Ohio. C. A. Herpich & Co.
H. 8. Half-striped. Pennsylvania. C. A. Herpich & Co.
H. 9. Striped. Connecticut. "
H. 10. White. Missouri. "

Striped skunk (*Spilogale zorilla*).

11136. Marsh Valley. Dr. F. V. Hayden.

Otter (*Lutra canadensis*), with specimens of the plucked and dyed fur, used for muffs, trimmings, &c.

2803. White River. Puget Sound. Dr. George Suckley.
24768. Labrador. G. R. Renfrew & Co., Quebec.
25752. Dressed by G. C. Treadwell & Co., Albany, N. Y.
25753. " "
25763. " "
H. 41. Natural. Maine. C. A. Herpich & Co.
H. 42. Natural. Plucked. Canada. C. A. Herpich & Co.
H. 43. Natural. Plucked and dyed. New York. C. A. Herpich & Co.

Mammal furs.

Sea otter (*Enhydra marina*), used for muffs, gloves, collars, cuffs, trimmings.

12262. St. Paul's Island, Alaska. H. W. Elliott.
12265. " " "
12263. " " "
H. 44. California. C. A. Herpich & Co.
H. 45. Silver tipped. California. C. A. Herpich & Co.

Black bear (*Ursus americanus*), used for caps, rugs, muffs, robes, &c.

24769. Labrador. G. R. Renfrew & Co., Quebec.
24770. " " "
H. 75. Minnesota.
H. 76. Kansas.
H. 77. West Virginia.
12510. White bear (*Thalarctos maritimus*), used for rugs, robes; extensively by the Eskimos.
19904–5. Grizzly bear (*Ursus horribilis*), used for rugs, robes, trimmings.
12507. Raccoon (*Procyon lotor*), used for hats, linings:
H. 1. Natural. Northern New York. C. A. Herpich & Co.
H. 2. Natural. Ohio. "
H. 3. Natural. Virginia. "
H. 4. Natural, plucked. Wisconsin. "
H. 5. Dyed black. Michigan. "
H. 6. Dyed black and silver pointed. Michigan. C. A. Herpich & Co.

Fur seal (*Callirhinus ursinus*) used for cloaks, hats, gloves, muffs, linings, trimmings, &c.

12513–14–15–16–17–18. St. Paul's Island, Alaska. H. W. Elliott.
9526. Unplucked. Hutchinson, Kohl & Co., San Francisco, Cal.
9527. Unplucked. Alaska. Hutchinson, Kohl & Co.
25757. Unplucked. Prybilov Islands, Alaska. Hutchinson, Kohl & Co.
25758. London dye. Alaska. C. A. Herpich & Co.
H. 93. " " "
22233. Unplucked. Alaska. G. C. Treadwell & Co., Albany, N. Y.
22234. Plucked. South Sea. " "
26610. Unplucked pelt of fur seal. Alaska.
26611. Plucked " ". "
26612. Plucked and dressed pelt of fur seal. Alaska.
26613. Plucked and dyed pelt of fur seal. Alaska. Alaska Commercial Company.

Antarctic fur-seal (*Arctocephalus aucklandicus*), &c.

25762. Dressed by G. C. Treadwell & Co. Islos de Diego Ramires.
25761. " " South Georgia Islands.
25760. " " "
25759. " " Staten Land, South Atlantic.
25756. " " South Shetland Islands.
25755. " " "
25754. " " "
26804–5–6–7. Deposited by Duryea & Hallet, Rahway, N. J.

Mammal furs.

Banded seal (*Histriophoca equestris*), used by Eskimos as fur.

7580. (Bag). Cape Romanzoff. W. H. Dall.

Square flipper seal (*Erignathus barbatus*).

12422. Labrador. Governor of Newfoundland.

Pacific hair seal (*Phoca Richardi?*).

H. 89. White coat. Pacific. C. A. Herpich & Co.
H. 90. White coat, silver pointed. Pacific. C. A. Herpich & Co.

Hood or bladder-nose seal (*Cystophora cristata*).

12424. Young. Labrador. Governor of Newfoundland.
12425. Bedlamer (1 year old). Labrador. Governor of Newfoundland.
12423. Labrador. Governor of Newfoundland.

Harp seal (*Pagophilus grœnlandicus*), with specimens of the white fur of the unborn cub and the blue fur of the young.

11828. Unborn. Newfoundland. Michael Carroll.
12427. Labrador. Governor of Newfoundland.
12421. Young. Labrador. Governor of Newfoundland.
12426. Bedlamer. " " "
13134. Sack made from white fur. Greenland. S. F. Baird.

Hair seal (*Phoca vitulina*), used for coats, caps, linings for shoes.

24771. Labrador. G. R. Renfrew & Co., Quebec.
H. 91. Dyed black. Halifax. C. A. Herpich & Co.
H. 92. Dyed brown. " "

Bison, or buffalo (*Bison americanus*) used for rugs and robes.

H. 82. Full furred winter.
H. 83. Fall robe. Montana. C. A. Herpich & Co.
H. 84. Summer robe. " "
H. 85. Indian painted. " "
H. 86. Yearling calf. " "
H. 87. Medium calf. " "
H. 88. Small calf. " "

Musk ox (*Ovibos moschatus*) used for robes, rugs, and trimmings.

12520. Hudson's Bay Territory.
12519. Calf. Hudson's Bay Territory.

Mountain sheep (*Ovis montana*).

H. 80. Montana. C. A. Herpich & Co.

Antelope (*Antilocapra americana*).

H. 81. Indian Territory. C. A. Herpich & Co.

Mammal furs

Elk (*Cervus canadensis*), used for rugs and robes.

H. 78. Montana. C. A. Herpich & Co.

Virginia deer (*Cariacus virginianus*).

12512. Virginia deer, used for trimmings and robes.

Black-tailed deer (*Cariacus columbianus*), used for robes and rugs.

11604–11605. Prepared by McCloud River Indians, California. Livingston Stone.
3565. Puget Sound. Dr. Kennerly.

Mule deer (*Cariacus macrotis*), used for trimmings, robes.

H. 99. Montana. C. A. Herpich & Co.

Woodland caribou (*Tarandus rangifer*, subspecies *caribou*), used for rugs, robes, &c.

24774. Labrador. G. R. Renfrew & Co., Quebec.

Barren ground caribou (*Tarandus rangifer*, subspecies *grœnlandicus*).

12363. (Albino.) F. Churchill, Hudson's Bay; W. W. Kirkby.
2050. (Young.) Robe from Mackenzie's River, H. B. T. R. Kennicott.

Moose (*Alces malchis*), used for rugs and robes.

24772. Labrador. G. R. Renfrew & Co., Quebec.

Mole (*Scalops* and *Condylura* sp.), used for robes and garments.

H. 72. United States. C. A. Herpich & Co.

Woodchuck or siffleur (*Arctomys monax*) robes, exported to Europe as "white and gray weenusk."

24776. Labrador. G. R. Renfrew & Co., Quebec.
H. 71. United States. C. A. Herpich & Co.

Marmot (*Arctomys caligatus*), used for robes and trimmings.

835. Robe. Indians of Rocky Mountains, west of Fort Good Hope, H. B. T. R. Kennicott.

Chinchilla (*Chinchilla laniger*) of South America, used for muffs, mantles, boas, cloak-linings, and trimmings.

H. 103. Real. Bolivia. C. A. Herpich & Co.
H. 104. Bastard. Chili. "

Parry's marmot (*Spermophilus Parryi*).

20793. Robe. Sitka, Alaska. J. G. Swan.
835. Robe. Indians of Rocky Mountains, west of Fort Good Hope, H. B. T. R. Kennicott.

Mammal furs.

Musquash (*Fiber zibethicus*), used for muffs, capes, caps, and linings and imitations of beaver fur.

24779. Labrador. G. R. Renfrew & Co., Quebec.
24780. Black variety. Labrador. G. R. Renfrew & Co., Quebec.
H. 12. Natural brown. Maine. C. A. Herpich & Co.
H. 13. Natural brown. Indiana. "
H. 14. Natural black. New Jersey. "
H. 15. Plucked and dyed. C. A. Herpich & Co.
H. 16. Plucked and colored. "

Neutria, or coypu (*Myopotamus coypus*), used for linings and muffs, and imitations of beaver.

H. 105. Plucked. Buenos Ayres. C. A. Herpich & Co.

Beaver (*Castor canadensis*), used for linings and muffs.

1230. Spotted albino. Bristol Bay, Alaska.
24777. American. Labrador. G. R. Renfrew & Co., Quebec.
24778. " " " "
12506. White.
H. 46. Dyed and silver tipped. Hudson's Bay Territory. C. A. Herpich & Co.
H. 47. Dyed and silver tipped. Canada. C. A. Herpich & Co.
H. 48. Dyed and plucked. Lake Superior. "
H. 49. Natural. Lake Superior. "
H. 50. Natural, in hair. Kansas. "

Hare (*Lepus*, various species).

H. 58. United States. C. A. Herpich & Co.
19615. Fur blanket. Pi-Ute Indians. Walker Lake, Nevada. Stephen Powers.

Rabbit, or cony (*Lepus cuniculus*), used for children's furs, and imitations of seal, beaver, &c., exported largely to China.

H. 51. Dyed brown, sheared. United States.
H. 52. Natural blue. "
H. 53. Natural white. "
H. 54. Dyed black. "
H. 55. Natural blue. "
H. 56. Natural white. "
H. 57. Gray. United States. C. A. Herpich & Co.

Possum (*Didelphys virginianus*).

H. 17. Ohio. C. A. Herpich & Co.

Mountain cat (*Bassaris astuta*).

H. 66. Montana. C. A. Herpich & Co.
H. 11. Missouri. "

Bird furs.

Loon (*Colymbus torquatus*).

1302. Used by Makah Indians in manufacture of robes. Nevah Bay, Washington Territory. J. G. Swan.
1296. Robe from down of. Neeah Bay, Washington Territory. J. G. Swan.

Swan's (*Cygnus americanus*) furs and swan's down trimmings.

H. 101. I. United States. C. A. Herpich & Co.
H. 102. II. " "

Brown pelican (*Pelecanus fuscus*).

9559. Tiburon Islands, Sonora. E. Palmer.

Goose (*Anser* sp.).

H. 99. United States. C. A. Herpich & Co.
H. 100. United States. "

7. LEATHER. (See under 20.)

8. TEXTILE FABRICS.

Prepared from hair of mammals.

Human hair used in manufacture of watch-chains.

Hair of bats used in felting and in plaiting ropes in Central America, and tassels in New Caledonia.

Hair of raccoon used in felting (largely exported to Germany for the use of hatters).

Hair of weasels and sables used in felting.

Hair of fur seal woven with silk in the manufacture of shawls.

Moose hair and its fabrics.

Ox and calf hair used in the manufacture of imitation woolen goods.

Sheep's wool, with specimens of fleeces and stapled wools, from various breeds and localities, short-wool fabrics, broadcloths, merinoes, flannels, mouselins de laine, serges, tweeds, blankets, carpets, and tartans, worsted fabrics, stuffs, bombazines, camlets, shawls, plushes and velvets, hosiery, and yarns, felts, felt-cloths, and felt-hats.

Goats' wool with specimens of mohairs, cashmeres, plushes, velveteens, camlets, and shawls. (For manufactured wigs and perukes, see under 21.)

(Yak (*Poëphagus grunniens*) wool with specimens of yak-lace and other fabrics.)

(Camels' hair with specimens of fabrics, plushes, felts, shawls, &c.)

(Hair of llama, paco, guanaco, and vicugna, with specimens of alpaca, guanaco, and other fabrics, and umbrellas and other articles manufactured.)

Prepared from hair of mammals.

Hair of horses used in weaving furniture-covers, crinoline-skirts, and bags for pressing oil.
Hair of buffalo used in plaiting ropes, lariats, &c.
Fur of mole used in felting.
Beaver (castor) fur with specimens of the felt cloths, hats, &c.
(Neutria-fur used in felting and in the manufacture of hats.)
Musquash fur used in felting.
Possum hair with fabrics of Indian and other manufacture.
Fur of rabbit and hare used in felting, with specimens of hats and cloths.
Whalebone fiber used in weaving cloth covers for telescopes, &c.

Prepared from feathers of birds.

Cloths woven from feather (China).

Prepared from silk of insects. (This collection should include specimens of the cocoons, the raw silk, the spun silk, and of the various fabrics, plain and figured silks, satins and satinettes, shawls, damasks, brocades, crapes, and ribbons.)

Silk of common silk-worm (*Bombyx mori*).
Silk of *Samia cecropia*, *Samia polyphemus*, and other native American moths.
(Silk of exotic moths other than *Bombyx mori*, such as the tussah (*Bombyx pernyi* and *Bombyx mylitta*), the moonga (*Saturnia assamensis*), the joree (*Bombyx religiosa*), the ena or arindy (*Bombyx cynthia*).)
Fabrics woven by the insects themselves, as *Tinea padilla*.
Silk of spiders.

Prepared from byssus of mollusks.

(Fabrics woven from byssus of the wing-shell (*Pinna nobilis*) and other mollusks.)

III. MATERIALS EMPLOYED IN THE ARTS AND MANUFACTURES.

Hard materials.

9. IVORY AND BONE.

Ivory of mammals.

Tusks of walrus used for trinkets, handles, jewelry, buttons, paper-knives, counters, &c.

25656. Tusks of walrus (*Rosmarus obesus*). Alaska. C. H. Crandall.
15592. Commercial walrus ivory. Poonook, Alaska. H. W. Elliott.
16174. Teeth of young walrus (*Rosmarus obesus*). Used in making powder chargers. Nunivak Island, Alaska. W. H. Dall.
24819. Ivory of walrus in rough state. Joseph Shardlow, New York.
24887. Scrimshawed tooth of walrus (*Rosmarus*). (Figure of lady.) Geo. Y. Nickerson, New Bedford, Mass.
24886. Scrimshawed tooth of walrus (*Rosmarus*). (Figure of lady and horse.) Geo. Y. Nickerson, New Bedford, Mass.
26896. Scrimshawed tooth of walrus (*Rosmarus Cookii*). Repulse Bay. Capt. H. C. Chester, Noank, Conn.
25654. Harpoon head made at sea from walrus tusk. J. H Bartlett & Sons, New Bedford, Mass.
2631. Handle of walrus ivory. Northwest coast, America. United States Exploring Expedition. Capt. Chas. Wilkes, U. S. N.
24815–6. Cane handles of walrus ivory. Joseph Shardlow, New York.
24812. Chain and cross of walrus ivory. " "
24814. Knobs of walrus Ivory. " "
24813. Scarf-slide of walrus ivory. " "
24817–18. Sword handles of walrus ivory. " "
24820–21–22. Knife handles of walrus ivory. " "
24823. Crochet-needles of walrus ivory. " "
24824. Pool-balls of walrus ivory. " "
24825–6–7–8–9–30–31–32. Buttons and studs of walrus ivory. Joseph Shardlow, New York.

Teeth of bears, dogs, wolves, foxes, peccaries, and other large mammals, used as implements, arrow-tips, and ornaments, by Indians.

6226. Bear teeth (used as ornaments). Bloomfield, N. Y. Col. E. Jewett.

Elk ivory (used by Indians for ornamentation).

1874. Ivory of elk (*Cervus canadensis*). Yamp Utah Indians, Utah. Captain Gunnison, U. S. A.

Tusks of mammoth elephant (*Elephas primigenius*) from Northern America and Asia, with Eskimo carvings.[1]

15385. Tusk of mammoth. Alaska. J. G. Swan.
11041. Comb. Made from the ivory of fossil elephant. Saint Michael's, Alaska. W. H. Dall.

[1]An interesting series of aboriginal carvings from mammoth ivory is displayed in the Ethnological division.

Ivory of mammals.

Teeth of peccary (*Dicotyles* sp.).[1]

Ivory of narwhal (*Monodon monoceros*), used for canes.

——. Tusks of narwhal. Greenland. U. S. Fish Commission.
13521. Cane made from tusk of narwhal. Eskimos of North Greenland. F. T. Commagere.

Teeth of sperm-whale (*Physeter macrocephalus*) and their application to the manufacture of balls, buttons, and trinkets.

25653. Teeth of sperm-whale. J. H. Bartlett & Sons, New Bedford, Mass.
25710. Teeth of cow whale. Capt. Joseph Fisher, Provincetown, Mass.
25719. Teeth of sperm-whale. Andrew Kennedy, Provincetown, Mass.
24906–8. Teeth of sperm-whale, polished. J. H. Clark, Newport, R. I.
25709. Teeth of the cow whale (scrimshawed). Capt. Joseph Fisher, Provincetown, Mass.
7428. Tooth of sperm-whale. Scrimshawed with British coat of arms and female figure. J. Varden.
24905. Tooth of sperm-whale. Scrimshawed and mounted as watch case, figure of American eagle. J. H. Clark, Newport, R. I.
24904. Tooth of sperm-whale. Scrimshawed with figure of crucifix and flowers. J. H. Clark, Newport, R. I.
24901. Tooth of sperm-whale. Scrimshawed with figure of whaling-ship. J. H. Clark, Newport, R. I.
24902. Tooth of sperm-whale. Scrimshawed with figure of America in colors. J. H. Clark, Newport, R. I.
24903. Tooth of sperm-whale. Scrimshawed with figure of girl dancing. J. H. Clark, Newport, R. I.
7659. Tooth of sperm-whale. Scrimshawed with this legend: "Taken * by * the * ship * Montreal * of * London * in * the * Pacific * Ocean * from * a * one * hundred * barrel * whale *. — * — 1835 *." Mrs. Dove, Washington, D. C., 1842.
24888. Tooth of sperm-whale. Scrimshawed with figure of General Washington and American eagle. Geo. Y. Nickerson, New Bedford, Mass.
24889. Tooth of sperm-whale. Scrimshawed with figure of General Scott and American eagle. Geo. Y. Nickerson, New Bedford, Mass.
7660. Tooth of sperm-whale. Scrimshawed with figure of pagoda. ??? Pacific Ocean. United States Exploring Expedition. Capt. Charles Wilkes, U. S. N.
25792. Tooth of sperm-whale (scrimshawed) Malcolm McFadyn, Gloucester, Mass.
24836. Balls turned from teeth of sperm-whale. Joseph Shardlow, New York.

Incisors of beaver (*Castor canadensis*) used by Indians for chisels, knives, and ornaments.

2684. Dice. Made from teeth of beaver. Oregon Indians. United States Exploring Expedition. Capt. Charles Wilkes.

[1] Interesting applications of this material may be found in the Ethnological series.

Ivory of reptiles.

Teeth of alligator used for jewelry, whistles, cane-handles, buttons, &c.

26895. Jewelry manufactured from teeth of alligator (*Alligator mississipiensis*). E. F. Gilbert, Jacksonville, Fla.

An extensive trade in alligator teeth has sprung up within the last ten years. Ten establishments in Eastern Florida are engaged in their manufacture into fancy articles.

Ivory of fishes.

Sharks' teeth used in arming weapons.[1]

Teeth of sharks and other fish used as trinkets.[1]

Jaws of the sleeper-shark (*Somniosus brevipinna*) used for headdresses by Indians.

——. Coronet of shark's teeth. Gulf of Saint Lawrence. G. R. Renfrew & Sons, Quebec.

Bone of mammals.

Parts of splanchno-skeleton of feræ, used as charms.

——. Os penis of raccoon, used as charm.

9476. "Os mirabilis" of walrus. Alaska. Gen. Geo. H. Thomas, U. S. A.

Bones of bear and other large mammals, used by Indians for implements and as tablets for paintings.[1]

Bones of buffalo and of the domestic ruminants, used as substitute for ivory in the manufacture of buttons, handles, combs, &c.

24855. Bone parasol-handle. Joseph Shardlow, New York.
24854. Bone parasol-handle. " "
24853. Bone parasol-handle. " "
24852. Bone counters. Joseph Shardlow, New York.
24851. Bone shields. " "
24850. Bone cribbage-pins. " "
24849. Bone dice. " "
24843-4-5-6-7-8. Bone brush-handles. Joseph Shardlow, New York.
24842. Bone martingale-rings. " "
24837. Bone napkin-rings. " "
24833-4-5-6. Bone parasol-handle. " "
19513. Bow. Made of bone. Greenland Eskimos. Geo. Y. Nickerson.
10280. Bow. Made of bone. Eskimo. King William's Land.
25673. Bone marlin-spike. Made at sea by Thomas Freeman. Used for splicing trawl-lines. Sanford Freeman, Norwich; cr., Mass.

Sperm-whale jaw-bone, used for harness-rings, martingales, &c.

29233-4-5-6-7-8-9-40. Parasol-handles made from sperm-whale's jaw. Harvey & Ford, Philadelphia.

[1] Displayed in Ethnological division.

Bone of mammals.

Sperm-whale jaw-bone, used for harness-rings, martingales, &c.

29241. Paper-cutters, made from sperm-whale's jaw. Harvey & Ford, Philadelphia.
24909. Chopping-knife. Made from jaw of sperm-whale. Prof. S. F. Baird.
25791. Sail-thimble. Made from bone of whale. J. W. Foster, Beverly, Mass.
25793. Seam-rubber. Used by sail-makers to rub along seams. Made from jaw-bone of sperm-whale. Frank Westerberger, Beverly, Mass.
25650. Sail-maker's hand-fid. Made at sea from jaw-bone of sperm-whale. A. R. Crittenden, Middletown, Conn.
25655. Saw-frame. Made at sea from bone of sperm-whale. J. H. Bartlett & Sons, New Bedford, Mass.
25801. Pulley. Made from jaw-bone of sperm-whale. E. H. Cook, Provincetown, Mass.
25649. Pulley-block. Made at sea from jaw-bone of sperm-whale. A. R. Crittenden, Middletown, Conn.
25713. Seine-needle. Made from jaw-bone of sperm-whale. N. H. Payne, Wellfleet, Mass.

Horn-cores of ruminants, used in manufacture of assayers' cupels.

Bone of birds.

Bones of birds, used by Indians and Eskimos in making awls, needles, flutes, bird-calls, and dress-trimmings.

10333. Gambling-sticks. Made from bones of white crane. Mojave Indians. Dr. E. Palmer.

Bone of fishes.

Fish-bones, used by Indians and Eskimos in making implements.[1]
Bone of sword-fish.

25675. Shoemaker's tool. Made from sword of sword-fish (*Xiphias gladius*). Sanford Freeman, Norwichport, Mass.

Sharks' vertebræ, used for canes.

Waste bone and ivory.

Use in manufacture of bone-black, ivory-black, and bank-note ink (see under 29).
Use in manufacture of sizes and glues (see under 24).
Use in manufacture of gelatine for food (see under 4).
Use in manufacture of phosphorus, carbonate of ammonia (hartshorn), and sal ammoniac (see under 30).
Use in manufacture of bone-charcoal for filters (see under 30).
Use in manufacture of paper.
Use of shavings in case-hardening gun-barrels and other fine steel.

[1] Displayed in Ethnological series.

Waste bone and ivory.

10. Horn.

(Embracing the varieties of horn known to commerce, the split and pressed horns, and the various manufactured articles, such as jewelry, combs, and handles.)

Horn (employed as a material).

Horns of ox, sheep, and goat, used for handles, buttoms, combs, powder-flasks, cups, boxes, stirrups, spoons, and imitations of tortoise-shell, also "sensitive Chinese leaves," and formerly for transparent plates in lanterns and horn-hooks, for trumpets, and for finger-nails in lay figures.

25277. Cow's horns. Philip R. Woodford, Boston, Mass.
25274. Steer's horns. " "
25276. Bull's horns. " "

Horn of buffalo, used like that of ox.

25278. Horns of buffalo bull. Philip R. Woodford, Boston, Mass.
25280. Horns of buffalo calf. " "
25279. Horns of buffalo cow. " "
8489. Spoon of buffalo horn. Assinaboin Indians. Fort Buford, Dakota. Dr. J. P. Kimball, U. S. A.
11030. Spoon of buffalo horn. Yellowstone Valley, Dakota. Lieutenant Cusick.

Horn of musk ox (*Ovibos moschatus*).

11648. Arctic regions. Capt. C. F. Hall.
10389. Spoon made from horns of musk ox. Igloolik. Capt. C. F. Hall.
25275. Ox horns. Philip R. Woodford, Boston, Mass.

Series of articles manufactured from horn. Geo. F. Lincoln, Leominster, Mass.:

29507. Horn as it comes from the press, cut out preparatory to making combs.
29508. Combs. Cut.
29509. Unfinished combs.
29510. Horn cut into small pieces for use in manufacture of jewelry.
29571. Finished comb.
29502. Polished jewelry (uncolored).

Horn of mountain sheep and mountain goat, used by Aleutians in making spoons, bowls, and numerous other implements.

16809. Horns of mountain goat (*Mazama montana*). Used by Eskimo for making horn spoons. Alaska. W. H. Dall.
20623–4. Spoon made from horn of mountain goat. Bella Bella Indians. J. G. Swan.
9278. Spoon made from horn of mountain goat. Alaska. A. H. Hoff, U. S. A.

Horn (employed as a material).

Horns of Rocky Mountain sheep (*Ovis montana*).

704. Spoon made from horn of Rocky Mountain sheep. Northwest coast. George Gibbs.
20842. Spoon made from horn of Rocky Mountain sheep. Haidah Indians. Prince of Wales Island, Alaska. J. G. Swan.
14455. Spoon made from horn of Rocky Mountain sheep. Pi-Ute Indians. Maj. J. W. Powell.

Antlers.

Antlers of deer, elk, and moose (stag horn), used in the manufacture of handles for instruments, trinkets, and buttons.

26229-2[illegible]30. Carving from horn of deer (*Cariacus virginianus*). Harvey & Ford, Philadelphia.
21312. Spoon carved fron antler of elk (*Cervus canadensis*). Hoopah Indians, California. S. Powers.

Antlers of deer, elk, moose, and nearly all species of ruminants, employed for ornamental purposes. (A series of these antlers is used in the decoration of the columns in the Government building.)

Chemical and other applications.

Burnt horn (*cornu ustum*) used in dentifrices.

Carbonate of ammonia (hartshorn), manufactured from deer horns. (See under 30.)

11. Hoofs and claws, &c.

(Embracing the commercial hoof, and the various stages of manufacture represented by specimens.)

Hoofs.

Hoofs of ox and bison, used in making buttons, combs, and handles.

26901. Commercial hoof. Philip R. Woodford, Boston, Mass.
Series of articles made from hoof. Geo. F. Lincoln, Leominster, Mass.:
29516. Dust made from the hoof.
29517. Belt buckle.
29518. Martingale rings.
29519. Breastpin.
29520. Cross for neck wear.
29521. Breastpin.

Hoofs of horse, used like those of ox and bison.

Hoofs of musk ox, deer, and antelope, used by Indians in ornamentation.

7443. Hoofs of musk ox. Used for trimming of garments by Eskimos. Mackenzie's River. R. MacFarlane.

Feet of deer, used for knife-handles, stool-feet, &c.

Claws.

Claws of bear, puma, wolf, &c., used by Indians in ornamentation. (See Ethnological series.)

Human nails, used by Indians for ornamental trimming.

Chemical application of hoofs and claws.

Use in manufacture of prussiate of potash (see under 30).

Use in manufacture of glue (see under 24).

12. BALEEN.

Whalebone in an unmanufactured state.

14042. Baleen of humpback whale (*Megaptera versabilis*). Coast of California, 1873. C. M. Scammon.

12311. Bone of humpback whale (*Megaptera versabilis*). Coast of California. C. M. Scammon.

13893. Baleen of humpback whale (*Megaptera versabilis*). Monterey, Cal. 1873. C. M. Scammon.

13019. Baleen of humpback whale (*Megaptera versabilis*). Monterey, Cal. 1872. C. M. Scammon.

12263. Baleen of humpback whale (*Megaptera versabilis*). San Luis, Cal. C. M. Scammon.

13020. Baleen of humpback whale (*Megaptera versabilis*). San Luis, Cal. C. M. Scammon.

13985. Baleen of sulphur-bottom whale (*Sibbaldius sulfureus*). Monterey, Cal. C. M. Scammon.

13984. Baleen of sulphur-bottom whale (*Sibbaldius sulfureus*). Monterey, Cal. C. M. Scammon.

12052. Bone of the California gray whale (*Rhachianectes glaucus*). Monterey, Cal. 1873. C. M. Scammon.

15402. Baleen. North Pacific. Capt. Henderson.

7494. Whalebone. Anderson River Eskimos. Mackenzie's River district. R. MacFarlane.

1108. Whalebone. Prepared by Anderson River Eskimos. Mackenzie's River district. R. MacFarlane.

1116. Whalebone. Anderson River Eskimos. Mackenzie's River district. R. MacFarlane.

2079. Whalebone. Arctic coast. R. MacFarlane.

24976. Whalebone fiber. Curled for bed-stuffing. J. A. Sevey, Boston, Mass.

24930. Whalebone. Prepared for whip-makers' use. J. A. Sevey, Boston, Mass.

24862. Whip with whalebone stock, knotted, inlaid with whale-tooth's ivory, handle wound with thin whalebone. American Whip Co., Westfield, Mass.

24950. Dress-bone. Whalebone prepared for dress-makers' use. J. A. Sevey, Boston, Mass.

24946. Whalebone. Prepared for suspender-makers' use. J. A. Sevey, Boston, Mass.

24945. Whalebone. Prepared for bonnet-makers' use. J. A. Sevey, Boston, Mass.

24941. Whalebone. Prepared for umbrella-makers' use. J. A. Sevey, Boston, Mass.

Whalebone in an unmanufactured state.

24940. Whalebone. Prepared for parasol-makers' use. J. A. Sevey, Boston, Mass.
24951. Gross dress-bone. Whalebone prepared for dress-makers' use. J. A. Sevey, Boston, Mass.
24948. White dress-bone. Whalebone (white) prepared for dress-makers' use. J. A. Sevey Boston, Mass.
24978. Whalebone. Prepared for brush-makers' use. J. A. Sevey, Boston, [Mass.
24942. Whalebone. Prepared for ribbon-weavers' use. " "
24943. Whalebone. Prepared for hat-makers' use. " "
24944. Whalebone. Prepared for cap-makers' use. " "
24947. Whalebone. Prepared for neck-stock-makers' use. " "
24952. Whalebone. Prepared for corset-makers' use. " "
24949. Round dress-bone. Whalebone prepared for dress-makers' use. J. A. Sevey Boston, Mass.
24977. Whalebone fiber. J. A. Sevey, Boston, Mass.
24938. Whalebone cane. Black and white, twisted. J. A. Sevey. Boston, [Mass.
24973. Whalebone boot-shanks. " "
24937. Whalebone tongue-scrapers. " "
24933. Whalebone probang. " "
24935. Whalebone riding-whip, made of black and white whalebone, twisted. J. A. Sevey, Boston, Mass.
24934. Whalebone riding-whip. J. A. Sevey, Boston, Mass.
24937. Whalebone cane. Plain. " "
24936. Whalebone cane. Twisted. " "
24972. Whalebone graining-comb. Used by painters. J. A. Sevey, Boston, [Mass.
24965. Whalebone probang. " "
24980. Whalebone caterpillar-brush. " "
24981. Whalebone shavings. " "
24933. Whalebone back-supporter. " "
24979. Whalebone flue-brush. " "
24975. Whalebone fiber shoe-brush. " "
24983. Whalebone. Sample. " "
24959. Whalebone divining-rod. " "
24958. Whalebone angling-rod tip " "
24953. Whalebone rosettes for harness. " "
24932. Whalebone landing-net rod. " "
24954. Whalebone hip busk bone. " "
24984. Whalebone. Price-list samples. " "
24970. Whalebone penholder. Black and white, twisted. " "
24961. Whalebone busk. " "
24964. Whalebone fore-arm bones. Artificial. " "
24938. Whalebone plait-raiser. " "
24939. Whalebone penholder. " "
24955. Manufactured corset, showing use of whalebone. " "
24953. Whalebone corset-clasps. " "
24960. Whalebone drill-bow " "
24957. Whalebone billiard-cushion springs. " "
24971. Whalebone paper-cutter. " "
24985. Whalebone rule. " "

Whalebone in an unmanufactured state.

24860. Whalebone and rattan whip-stalk. Finished, ready for covering. American Whip Company, Westfield, Mass.
24858. Whalebone. As prepared for use in the whip. American Whip Company, Westfield, Mass.
24859. Whalebone and rattan. Fitted ready for sticking together for whip-stalk. American Whip Company, Westfield, Mass.
24857. Whalebone. In rough state, as sold to whip manufacturers. American Whip Company, Westfield, Mass.
24982. Whalebone. Prepared for whip-makers' use (patent). J. A. Sevey, Boston, Mass.

13. TORTOISE-SHELL.

Tortoise-shell (*Eretmochelys squamata* Linn.).

12387-8-9-90. Tortoise-shell (*Eretmochelys squamata* Linn.). Pacific hawk's-bill turtle. Pacific coast.
24890. Commercial tortoise-shell. George Y. Nickerson, New Bedford, Mass.
26891. Tortoise-shell jewelry, &c. Charles W. Kennard & Co., Boston, Mass.:
Comb cut and polished.
Comb cut before polishing.
Brooch and ear-rings.
Sleeve-buttons.
Necklace and locket.

14. SCALES.

Scales of fishes used in ornamental work, with specimens of flowers and other articles manufactured.

Fish-scale jewelry. F. C. Keergaard & Co., Philadelphia, Pa.:

25480. Scales of sheepshead (*Archosargus probatocephalus*).
25481. Scales of sheepshead (*Archosargus probatocephalus*). Prepared for use.
25482. Brooch and ear-rings. " "
25483. Spray of flowers. " "
25484. Spray of flowers. " "
25485. Spray of flowers. " "
25486. Spray of flowers. " "
25487. Spray of flowers (dyed). " "
25488. Necklace and cross. " "
25489. Brooch and ear-rings. " "
25490. Brooch and ear-rings (dyed) (*Archosargus probatocephalus*).
26892. Jewelry made from scales of mullet, drum, &c. Mrs. C. E. Mott, Jacksonville, Fla.

(Pearl white, or *essence d'Orient*, prepared from scales of *Alburnus lucidus* and other *Cyprinidæ* and *Clupeidæ*, used in making artificial pearls.) (See under 27.)

26893. Essence d'Orient. (Introduced for comparison.) Gustave Bossange, Paris.

15. PEARL.

Pearls and nacre (embracing the pearl-yielding shells, with the pearls and the mother-o'-pearl in the rough state, with the manufactured buttons, handles, and jewelry, pearl-powder, inlaid work, and papier-maché, ornamented with mother-o'-pearl.

Top-shells (*Turbinidæ*), and their application to manufacture of shell-flowers.[1]

Tower-shells (*Trochidæ*).[1]

Ear-shells (*Haliotidæ*), used in manufacture of buttons, handles, inlaid work, and pearl powder.[1]

Other gasetropods supplying nacre.[1]

Pearl-oysters (*Aviculidæ*), with pearls and nacre.[1]

River-mussels (*Unionidæ*), with pearls and nacre.[1]

Mussels, oysters, and other conchifers supplying pearls and nacre.[1]

Shells of nautilus and argonaut, prepared to exhibit their nacre.[1]

Ornamental pearl-work, imitating sprays of flowers, &c.[1]

Imitation pearls.[1]

16. SHELL.

Cameo shell.[1]

Shell of conch (*Strombus gigas*), and carvings.[1]

Shell of helmet (*Cassis rufa*, *C. tuberosa*, and *C. madagascariensis*), with carvings.[1]

Shells used for implements, &c.[1]

Shells of *Strombus*, *Triton*, *Dolium*, *Fusus*, *Murex*, and *Buccinum*, used for fog-horns, lamps, vases, and ornamental borders in flower-gardens.[1]

Shells of *Busycon*, *Sycotypus*, *Mactra*, &c., used by Indians in manufacture of implements, with specimens of implements.[1]

Shells of *Mactra*, used for ladles, scoops, and spoons by fishermen.[1]

Shells of *Tridacna*, used for vases, fountains, and in the manufacture of handles and carvings.[1]

Shells of *Pecten*, *Haliotis*, *Dentalium*, *Mercenaria*, &c., used by Indians for trimmings and ornaments.[1]

Shells of *Pecten*, used in making pin-cushions and purses.[1]

Shells of *Mercenaria violacea*, *Purpura lapillus*, and *Buccinum undatum*, used by Indians of eastern coast in manufacture of money, with specimens of wampum (with the modern wampum or shell-beads, manufactured for the Indian trade), and of the hyqua or *Dentalium* shells, employed in a similar manner by the Indians of the Pacific coast.[1]

Specimens of the cowry (*Cypraea moneta*), "live cowry" and dead cowry, used in African trade and for trimmings.[1]

[1] See in Part II of the present catalogue.

Shells used for implements, &c.

Shells of *Cypraea*, *Rotella*, *Oliva*, *Turritella*, *Phasianella* (Venetian shells), &c., mounted as buttons and jewelry.[1]

Composition shell-work for box-covers and frames, made by gluing shells in mosaic.[1]

Calcined shells, used by dentifrice and porcelain makers.[1] (See, also, under 32.)

Cuttle-fish bone from *Sepia officinalis*, used as a pounce, as a dentifrice, as polishing powders, for taking fine impressions in counterfeiting, and as food for birds.[1] (See, also, under D 5.)

Concretions from the stomach of *Astacus*, known as "crab's-eyes" and "crab-stones," and used as antacids.[1]

Shell of king-crab (*Limulus polyphemus*), used as a boat-bailer.[1]

Opercula of mollusks, used as "eye-stones."[1]

17. CORAL.

Coral as a material.

Red coral (*Corallium nobilis*), with specimens of the five commercial grades (1, froth of blood; 2, flower of blood; 3, 4, 5, blood of first, second, and third qualities) of the white variety, and of the round beads, *negligée* beads, bracelets, pins, coronets, armlets, ear-rings, &c.[1]

White coral, *Oculina*, sp., used by jewelers.[1]

Madrepores and other showy corals, used for ornamental purposes.[1]

Horny axis of black flexible coral (*Plexaura crassa*), used for canes and whips in the Bermudas.[1]

Axis of fan coral (*Rhipidogorgia*), used for skimmers and strainers in the Bermudas.[1]

Coral, used for building purposes.[1]

Coral rock of recent formation (Coquina), used in Florida in manufacture of ornamental vases and carvings.[1]

Calcined coral, used for dentifrices, as an antacid, &c.[1]

Imitations of red coral in celluloid, rubber, and other substances.[1]

18. INFUSORIAL EARTHS.

Polishing powders (used for polishing metals, cabinet-ware, and stone).

Specimens of polishing slate, tripoli, and other foreign polishing powder.[1]

Specimens of American infusorial deposits.[1]

[1] See under Part II of this catalogue.

Infusorial earths employed in manufactures.

Infusorial earth, used in making window and plate glass.[1]
Infusorial earth, used in making soluble glass.[1]
Infusorial earth, used in making mortar.[1]
Infusorial earth, used in making molds for metal casting.[1]
Infusorial earth, used in making filters.[1]
Infusorial earth, used in making dynamite.[1]
Infusorial earth, used in making fire-poof packing.[1]
Infusorial earth, as an absorbent for oils and liquids.[1]

19. OTHER MATERIALS FROM INVERTEBRATES.

From insects.

Brazilian diamond-beetles, used in jewelry.
Wings of beetles, used in embroidery.

From echinoderms.

Spines of echinoids, used for slate-crayons.

Flexible materials.

20. LEATHERS. (Embracing the hides in a rough state, in the various stages of dressing, and manufactured into shoe-leather, parchment, vellum, binders' leather, thongs, &c.

Leather prepared from mammal skins.

Leather prepared from human skin.

26070. Boots made from skin of man. H. & A. Mahrenholz, New York.

Sea-lion leather, used by Eskimos to cover bidarkas, and for garments and beds.

11371. Leather of sea-lion (*Eumetopias stelleri*). Used by Aleutian Islanders for manufacture of canoe. Alaska. Vincent Colyer.

Walrus leather, used by Eskimos for harness, tables, thongs, seal-nets, and for covering polishing-wheels.

15617. Harpoon-line of walrus leather. Alaska. H. W. Elliott.

Seal leather, used for fine shoes and in the manufacture of "patent leather," and by Eskimos for numerous purposes.

10186. Seal-skin bleached by hot water. Innuit Eskimos. Arctic Ocean. Capt. C. F. Hall.
1103. Seal-skin leather tanned by Eskimos. Mackenzie's River district. R. MacFarlane.
24785. Indian moccasins made from skin of seal (*Phoca vitulina?*) G. R. Renfrew & Co., Quebec.

[1] See under Part II of this catalogue.

Leather prepared from mammal skins.

Bison leather (and buffalo leather, buff-leather).

25951. Imitation buckskin. Manufactured from skin of American bison (*Bison americanus*). Wilcox Tannery, Elk County, Pennsylvania.
25952. Collar leather. Manufactured from skin of American bison (*Bison americanus*). Wilcox Tannery, Elk County, Pennsylvania.
25954. Sole leather. Manufactured from skin of American bison (*Bison americanus*). Wilcox Tannery, Elk County, Pennsylvania.
25953. Whang leather. Manufactured from skin of American bison (*Bison americanus*). Wilcox Tannery, Elk County, Pennsylvania.

Ox leather, with specimens of sole leather, split leather, grain leather, rawhide thongs, whips, leather belts and saddles, and of calf-skins, prepared for binders' and bootmakers' use, as Russia leather and vellum, and tawed, as parchment.[1]

Sheep leather, with specimens of binders' leather, imitation chamois leather, wash leather, buff leather, roan, imitation morocco and parchment, with vellum made from skins of dead-born lambs, and manufactured gloves, &c.[1]

Goat leather, with specimens of shagreen leather, morocco leather, as used for linings, upholstery, bindings, and pocket-books, parchment, drum-heads, &c., with kid leather, used in manufacture of shoes and gloves, under-clothing, and vellum made from skin of young kids, also skin bottles used in Asia.[1]

Horse and ass leather, used in manufacture of shagreen, sole leather, harness-leather, saddles, trunks, water-hose, pump-valves, military accouterments, ladies' shoe-uppers.[1]

8871. Tanned ox-skin, used for sole leather. Cheyenne Indians, Kansas. Dr. G. M. Sternberg, U. S. A.

Rawhide.

29549. Rawhide prepared for belting. Darrow Manufacturing Company.
29546. Coil of rope. Made from rawhide. "
29548. Basket. " "
29547. Doll's head. " "
29545. Powder-flasks. " "

Deer leather, dressed as buff leather, chamois-imitation leather, Indian dressed (buckskin), and for the finer moroccos, also manufactured into gloves, gaiters, under-garments, polishers, &c.

25282. Buck-tanned skin of mule deer (*Cariacus macrotis*). Indians.
6977. Leather from skin of deer (*Cariacus macrotis?*). Tanned by Caddo Indians. E. Palmer.
5554. Buck-tanned deer-skin (*Cariacus macrotis*). Apache Indians. E. Palmer.
14383. Buck-tanned skin of deer (*Cariacus macrotis*). J. W. Powell.

[1] In view of the extensive exhibition of leathers in the Shoe and Leather Building, no special effort has been made to complete this part of the collection.

Leather prepared from mammal skins.

Deer leather, &c.

6978. Buck-tanned skin of deer (*Cariacus macrotis*). Comanche Indians. E. Palmer.
11606. Buckskin (*Cariacus columbianus*). Dressed by McCloud Indians. Shasta County, California. Livingston Stone.
11605. Buckskin (*Cariacus columbianus*). Tanned by McCloud Indians. Shasta County, California. Livingston Stone.
11604. Buckskin (*Cariacus columbianus*). Tanned by McCloud Indians. Shasta County, California. Livingston Stone.
8540. Buckskin for moccasins. Nebraska. Dr. S. M. Horton, U. S. A.
26885. Skin of Virginia deer (*Cariacus virginianus*). Seminole Indians of Florida. G. Brown Goode.
24800. Tanned skin of young Virginia deer (*Cariacus virginianus*). J. H. Henderson, Big Coon, Ala.

Moose leather in ordinary and buckskin finish.

24781. Moccasins made from skin of moose (*Alces malchis*). Huron Indians. G. R. Renfrew & Co., Quebec.
24787. Rubber-sole moccasins made from skin of moose (dyed). G. R. Renfrew & Co., Quebec.
24782. Indian moccasins made from skin of moose. Iroquois tribe. G. R. Renfrew & Co., Quebec.
24773. Indian buck-tanned skin of moose (*Alces malchis*). Labrador. G. R. Renfrew & Co., Quebec.
24786. Indian moccasins made from skin of moose. "Lady's size." G. R. Renfrew & Co., Quebec.
838. Smoke-tanned skin of moose (*Alces malchis*). Slave (Lake?) Indians. R. Kennicott, Fort Liard.

Caribou leather in ordinary and buckskin finish.

24775. Indian buck-tanned skin of caribou (*Tarandus rangifer*). Labrador. G. R. Renfrew & Co., Quebec.
24783. Indian moccasins made from skin of caribou. "Man's size." G. R. Renfrew & Co., Quebec.
24784. Indian moccasins made from skin of caribou. "Woman's size." G. R. Renfrew & Co., Quebec.

Reindeer leather.[1]

836. Smoke-tanned skin of barren-ground caribou (*Tarandus rangifer*, subspecies *grœnlandicus*). Mackenzie's River district. R. Kennicott.

Elk leather in ordinary and buckskin finish.

8536. Elk-skin tanned with smoke. Nebraska. Dr. S. M. Horton, U. S. A.

Mountain-sheep leather.

8548. Buck-tanned skin of mountain sheep (*Ovis montana*). Nebraska. Dr. S. M. Horton, U. S. A.

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[1] See garments in Ethnological division.

Leather prepared from mammal skins.

Series of different leathers illustrating the manufacture of gloves:

25286. Raw skin of "Maranham jack" deer (*Cariacus* sp.) from South America. S. G. Hutchinson & Co., Johnstown, N. Y.

25287. Skin of "Maranham jack" deer, dressed by glove manufacturer, ready for cutting. S. G. Hutchinson & Co., Johnstown, N. Y.

25288. Gloves manufactured from skin of "Maranham jack" deer. S. G. Hutchinson & Co., Johnstown, N. Y.

25289. Raw skin of deer (*Cariacus* sp.). From Central America. S. G. Hutchinson & Co., Johnstown, N. Y.

25290. Skin of deer dressed by glove manufacturers. Central America. S. G. Hutchinson & Co., Johnstown, N. Y.

25291. Raw skin of mule deer (*Cariacus macrotis*). S. G. Hutchinson & Co., Johnstown, N. Y.

25292. Skin of mule deer (*Cariacus macrotis*). Fat or liquor dressed. S. G. Hutchinson & Co., Johnstown, N. Y.

25293. Skin of mule deer (*Cariacus macrotis*). Oil dressed. S. G. Hutchinson & Co., Johnstown, N. Y.

25294. Gloves made from skin of mule deer (*Cariacus macrotis*). S. G. Hutchinson & Co., Johnstown, N. Y.

25295. Raw skin of African "blees bok." S. G. Hutchinson & Co., Johnstown, N. Y.

25296. Skin of African "blees bok" (dressed). S. G. Hutchinson & Co., Johnstown, N. Y.

25297. Gauntlet gloves made from skin of African "blees bok." S. G. Hutchinson & Co., Johnstown, N. Y.

25298. Raw skin of prong-horn or antelope (*Antilocapra americana*). S. G. Hutchinson & Co., Johnstown, N. Y.

25299. Skin of prong-horn or antelope (*Antilocapra americana*). Dressed and colored. S. G. Hutchinson & Co., Johnstown, N. Y.

25300. Gloves made from skin of prong-horn or antelope (*Antilocapra americana*). S. G. Hutchinson & Co., Johnstown, N. Y.

25301. Raw skin of south American peccary (*Dicotyles labiatus*). S. G. Hutchinson & Co., Johnstown, N. Y.

25303. Gloves made from skin of South American peccary (*Dicotyles labiatus*). S. G. Hutchinson & Co., Johnstown, N. Y.

25302. Skin of South American peccary (*Dicotyles labiatus*). Dressed for glove manufacturer. S. G. Hutchinson & Co., Johnstown, N. Y.

25304. Buck-tanned skin of sheep. " "

25305. Dressed skin of sheep, tanned like kid leather, but smoked instead of colored. S. G. Hutchinson & Co., Johnstown, N. Y.

25306. Sheep-skin made into "kid leather." S. G. Hutchinson & Co. Johnstown, N. Y.

25307. Gloves made from "kid-dressed" sheep-skin. S. G. Hutchinson & Co., Johnstown, N. Y.

25308. "Kid"-dressed lamb-skin, ready for coloring. S. G. Hutchinson & Co., Johnstown, N. Y.

25309. Lamb-skin "kid-dressed," colored. S. G. Hutchinson & Co., Johnstown, N. Y.

25310. Gloves made from "kid-dressed" lamb-skin. S. G. Hutchinson & Co., Johnstown, N. Y.

25311. Lamb-skin dressed in Germany. S. G. Hutchinson & Co., Johnstown, N. Y.

Leather prepared from mammal skins.

Series of different leathers illustrating the manufacture of gloves.

The following account of the glove trade in North America is from the pen of Mr. S. G. Hutchinson:

"The manufacture of gloves and mittens from leather was started in Fulton County, New York (according to best information), in the year 1809, by people from Connecticut, who first engaged in the manufacture of tinware and in exchanging their tinware for the products of the country. They thus obtained deer-pelts, which they learned to tan according to the Indian process, and, using paper patterns, cut and made them into rough mittens and gloves. Subsequently they learned a better process of tanning, and also have made great improvements in manufacturing gloves; and from apparently insignificant and accidental beginnings has originated an industry which is estimated to produce over $4,000,000 worth of manufactured goods, and which business has never as yet been successfully transplanted elsewhere.

"The skins used in the manufacture of gloves and mittens are the different varieties of deer-skins and sheep and lamb skins. The deer-skins are gleaned from the entire United States, Mexico, Central and South America, and Africa, and there is as much difference in the quality of the skins from the different countries as in the climate of the countries or localities from which they come. The heaviest and most valuable skins come from under the equator.

"Sheep-skins are extensively used in the manufacture of gloves as well as deer-skins. It is estimated that over 100,000 dozen are used annually. The quality of these varies as much as deer-skins, and depends as much upon the section of country from which they come, the coarse-wool skins making the best leather. A part of the sheep-skins are dressed in a similar manner to the deer-skins, and are finished to resemble buckskin. Many sheep and lamb skins are by a very different process made into what is called kid leather, the lamb-skins, especially, making a very nice glove; in fact, some of the lined fur-trimmed gloves made from this kid leather excel any of foreign manufacture.

"To give a more definite idea of where the deer-skins come from, I will give a little item of statistics of arrivals of deer-skins at the port of New York in the years 1868 to 1872, inclusive:

Whence.	1868.	1869.	1870.	1871.	1872.
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*
Central America	254,200	249,000	252,900	230,700	249,000
Para	288,500	214,900	185,700	150,900	141,800
Angostura	100,000	89,600	173,000	157,500	65,000
Puerto, Cal.	60,000	210,300	115,000	31,500	154,400
Sisal	105,000	62,000	84,000	67,700	125,500
Honduras	60,800	52,300	61,500	57,900	62,500
Vera Cruz	30,000	26,700	19,000	19,500	21,000
Campeachy	24,000	12,500	19,400	21,000	12,500
Total	923,000	917,300	909,600	736,700	832,200

"And to give you something of an idea of how these deer-skins are converted into leather ready for cutting into gloves, I will copy a poem written by Horace Sprague in 1859. However, the operation has been somewhat changed and much improved since:

"'And be it mine in brief to comprehend,
From the inception to the final end,
Through every process, how the routine moves
From unwrought hides to manufactured gloves.

Leather prepared from mammal skins.

Series of different leathers illustrating the manufacture of gloves:

First into vats, low sunken in the ground,
The rattling skins are thrown with husky sound,
And there for days are suffered to remain,
Until the water permeates the grain,
And their whole yielding form and texture make
Pliant and supple, fitting them to break.
Prone o'er the slanting beam the breaker plies,
With long two-handled knife, his energies
All the adhering flesh to clean away.
His is the hardest work and poorest pay.
Flesh-liming, or the hairing process called,
Is next in order and is next installed.
Upon the flesh-side of the broken skin
Quick-lime is spread and safely folded in;
Then in the soak or water vat with care
'T is placed ten days for loosening the hair,
And when the beam and knife again are proved
The hairy coat is easily removed.
In lime-vats next the skins are put to lime;
From one to six weeks is the allotted time.
This process, perfected by low degrees,
Thickens the skins and smooths the surfaces.
Frizing requires the beam and knife again,
To shave clean off the cuticle or grain.
Parching is used for heavy skins alone.
The meaning of the term is drying down;
Not in the fervors of the scorching sun,
But in the shade alone, 't is safely done.
A soaking then ensues until
They 're softer made and fitted for the mill.
Milling in order next succeeds, of course.
Placed in the stock, by steam or water force
The skins are briskly run six hours or more
To supple them and open every pore,
Then taken out to air. With oil imbued,
Replaced again, and milling is renewed.
Each half hour afterward alternately
They 're in the stocks or out to air and dry,
Until throughout the substance of the skin
The oil commingles with the gelatine
Or glue, and leaves the other parts together
The true and genuine product we call leather.
The beam and scudding-knife again are plied
For scudding on the grain or facial side.
The mucous substance or reticular
Tissue of the skin is shaved off bare.
The process then, to perfect and to crown,
Requires a day at most for drying down.
Next in lye-liquor vats they 're placed awhile,
In vulgar parlance, 'for to cut the ile';
But by the chymic law affinity
The oil gelatinous and alkali
Combine, without a figure or a trope,
And form the useful product we call soap.
A half hour in the stocks the skins being run,
The soap washed out, and thus the scouring 's done.
To soften, to give shape, and natural size,
Duly the stacking process next applies.
Fast in the perch the pendent skin being placed,
Grasped by the hand and firmly shoulder-braced,
The arm-stake then is vigorously applied
To supple and extend the leathery hide,
While the knee-stake is more suitably found
Fitted to stretch and smooth the edges round.
Ocher with water mixed, when dried enough
And into square blocks fashioned, is called buff,

Leather prepared from mammal skins.

Series of different leathers illustrating the manufacture of gloves.

Which by the hand is rubbed upon the skin.
Perch hung until the ocher's well wrought in
And deeply set, producing a soft, mellow,
Golden, enduring, inerasive yellow.
This buffing named. The process next to bring
The manufacture through is finishing.
A horizontal shaft, firm overlaid
With emery, and by machinery made
To turn, elaborates the skin placed on
To perfect smoothness, and the work is done.'

"The manufacture of the different kinds and styles of gloves is becoming divided up so that many of our leading manufacturers are making a specialty of some particular kind of gloves. Some make exclusively heavy buckskin gloves and mittens; others make exclusively sheep-skin gloves and gauntlets; others, lined kid gloves of various kinds and styles; others, unlined kid and antelope or castor gloves and ladies' gauntlets, thus enabling them to pay strict attention to their particular branch, and reaching the highest degree of perfection attainable at this age and stage of the business.

"Marked progress is yearly made in this industry, and it is predicted that in no distant future the finest gloves made in the world will be made here in the two villages of Johnstown and Gloversville, N. Y."

Porpoise leather.

Beluga leather dressed as kid, sole, harness, velvet, plush, boot, mail-bag, belt, and patent (varnished) leather.

26018. Tanned skin of beluga (*Delphinapterus catodon*). G. R. Renfrew & Co., Quebec.

26019. Lace leather, "Riviére du Loup en bas." Manufactured from the skin of beluga (*Delphinapterus catodon*), by the Gulf Porpoise Fishing Company.

Beaver leather, used in manufacture of saddles, shoes, gloves, and trunks.

Rat leather, used for thumbs of kid gloves.

Leather trimmings, used as stuffing for balls, &c.

Prepared from intestines of mammals.

Parchment from viscera of seals, used by Eskimos for clothing, bags, and blankets.

6559. Intestine of seal. Used for waterproof clothing. Cook's Inlet. Dr. T. T. Minor.

5570. Intestine of seal. Used for waterproof clothing. Yukon River. W. H. Dall.

6559. Intestine of seal. Prepared and used for clothing. Dr. T. T. Minor.

20802. Prepared seal-gut for waterproof dresses. Sitka, Alaska. J. G. Swan.

See also numerous garments of this material displayed in the Ethnological division.

Prepared from intestines of mammals.

Leather from pharynx of seal and walrus, used by Eskimo for boot-soles.

Parchment from viscera of bears, used in Kamtchatka for masks and window-panes.

Viscera of ox, used in manufacture of gold-beaters' skin.

Bladders of animals, used for pouches, parchment, bottle and jar covers, and by Eskimo for oil-bottles.

Viscera of sheep, used in manufacture of "cat-gut," with specimens of whip-cord, hatters' cord, for bowstrings, clockmakers' cord, filandre, guitar, violin, and harp strings, angling-lines, &c.

Viscera of hog, used as envelopes for minced meat, sausages, &c.

Throat of sea-lion (*Eumetopias Stelleri*), dressed as parchment envelopes to preserve valuable papers.

20803. Sitka Indians, Alaska. J. G. Swan.

Sinews of sheep, deer, goat, buffalo, seal, walrus, and other animals, used in manufacture of threads, lines, nets, and snow-shoes, in strengthening bows, &c.; the babiche of the Eskimos of the Northwest coast.

5185. Babiche. Siccanee Indians. British Columbia. J. T. Rothrock.
2034. Mackenzie's River. R. Kennicott.
849. Mackenzie's River. "
842. Moose sinew. Fort Good Hope. Mackenzie's River. R. Kennicott.
2036. Sinews of moose and caribou. Fort Liard Indians. "
5546. Deer sinew. Apache Indians. Dr. E. Palmer.
2200. Babiche. Undressed skin of mountain sheep.
843. Babiche from mountain sheep. Mackenzie's River. R. Kennicott.
1882. Bow covered with sinew of mountain sheep (*Ovis montana*). Digger Indians. California. Captain Gunnison, U. S. A.
24788. Snow-shoes made from sinew of caribou (man's size). G. R. Renfrew & Co., Quebec.
24789. Snow-shoes made from sinew of caribou (woman's size). G. R. Renfrew & Co., Quebec.

Prepared from bird-skins (Eskimos).

Eider leather.[1]

Auk leather.[1]

7453. Oil-bag. Made from skin of loon's foot. Fort Anderson. R. MacFarlane.

Prepared from reptile skins.

Alligator leather.

16810. Salted skin of alligator (*Alligator mississippiensis*). Upper Saint John's River, Florida. G. Brown Goode.
16810. Tanned skin of alligator. Upper Saint John's River, Florida. G. Brown Goode.

[1] See garments in Ethnological series.

Prepared from reptile skins.

Alligator leather.

25283. Tanned skin of alligator (*Alligator mississippiensis*). Upper Saint John's River, Florida. G. Brown Goode.

24791. Tanned skin of alligator (*Alligator mississippiensis*). "Russet finish." Schayer Bros., Boston, Mass.

24796. Cigar-case, made from skin of alligator (*Alligator mississippiensis*). "Russet finish." Schayer Bros., Boston, Mass.

24792. Lady's satchel, made from skin of alligator (*Alligator mississippiensis*). "Russet finish." Schayer Bros., Boston, Mass.

24795. Match-case, made from skin of alligator (*Alligator mississippiensis*). "Russet finish." Schayer Bros., Boston, Mass.

24793. Slippers, made from the skin of alligator (*Alligator mississippiensis*). "Russet finish." Schayer Bros., Boston, Mass.

24794. Slippers, made from skin of alligator (*Alligator mississippiensis*). "Black finish." Schayer Bros., Boston, Mass.

26068. Riding-boots, made from skin of alligator (*Alligator mississippiensis*). H. & A. Mahrenholz, New York City.

Rattlesnake leather.

24797. Dressed skin of rattlesnake (*Crotalus durissus*). Big Coon, Ala. J. H. Henderson.

24799. Dressed skin of rattlesnake (*Crotalus durissus*). Big Coon, Ala. J. H. Henderson.

24798. Shoes made from skin of rattlesnake (*Crotalus durissus*). Big Coon, Ala. J. H. Henderson.

9043. Bow covered with skin of rattlesnake. Used by Flathead Indians. Fort Colville, W. T. Dr. J. T. Ghisslin, U. S. A.

Other snake leather.

26069. Boots made from skin of boa (*Boa constrictor*). H. & A. Mahrenholz, New York.

Prepared from fish-skins.

Leather prepared from scaled fish by Indians.

16091. Salmon-skins dressed as leather and used in making waterproof shirts and boots by Magemut Eskimo. Nunivak Island, Alaska. W. H. Dall.

10347. Parky, or upper garment, made from the skin of codfish (?). Nunivak Island, Alaska. W. H. Dall.

Eel leather, made for pigtails, queues, flail-thongs.
Skins of eels (*Anguilla vulgaris*).

25285. Eel-skins. Market, Washington, D. C. G. Brown Goode.
These eel-skins are highly esteemed by the Virginia negroes as a cure for rheumatism.

Sturgeon leather.

26013. Tanned skin of sturgeon (*Acipenser rubicundus*). Wernich & Wandel, Waukegan, Ill.

Prepared from fish-skins.

Shark leather (shagreen used for coverings, and by the Alaska Indians for boot-soles).[1]

Leather waste.

Paper manufactured from waste.
Glue manufactured from waste. (See under 24.)
Prussian blue made from leather waste. (See under 30.)

21. HAIR AND WOOL.

Hair used in weaving and felting. (See under 8.)
Hair used for wigs and ornaments.

Human hair as an article of commerce, with specimens of switches and wigs, and also of the trade imitations of hair in jute, horsehair, &c.
Goat's wool as employed in manufacture of wigs and perukes.
Human scalp locks as Indian trophies.[2]
Scalps of animals as trophies.[2]

Hair and bristles used for brushes (embracing the commercial hair and bristles, assorted and unassorted, and specimens of the manufactured articles).

Hair of skunk, used for fine brushes.

29340. Gilders' and varnishers' brushes (black hair; flat). Miles Bros. & Co.
29341. " " " " " " "
29342. " " " " " " "
29343. " " " " " (round). "
29344. Dusting-brush (white hair; flat). "

Hair of bear used for varnishing-brushes.

29338. Varnish or dusting brush. Miles Brothers & Co.
29339. "Mottler" brush. "

Hair of American badger used for fine shaving, graining, gilding, and dust brushes.[3]
Hair of American badger (*Taxidea americana*) adapted to the manufacture of brushes.
Hair of squirrel, especially the tail, used in making fine artists' pencils.

29320. "Camel's-hair" varnish-brush. French style. Miles Brothers & Co.
29321. "Camel's-hair" coach-painters' color-brush. "

[1] See garments in Ethnological series.
[2] See specimens in the Ethnological division.
[3] The badger-hair brushes sold in America are almost exclusively manufactured from the hair of the European badger. The hair of the American badger is quite as well adapted to the purpose.

Hair and bristles used for brushes.

Hair of squirrel, especially the tail, used in making fine artists' pencils.

29322. "Camel's-hair" varnish or copying brush. English style. Miles Brothers & Co., New York.
29322. "Camel's-hair" gilders' brush. Miles Brothers & Co., New York.
29324–5. "Camel's-hair" lacquering brush. " "
29326. "Camel's-hair" pencil, quill handles. " "
29353. Series of scrolling and ornamenting brushes. " "

These brushes are made chiefly from the tail of the gray squirrel (*Sciurus carolinensis*), and are known to the trade as "camel's-hair" brushes.

Bristles of hog and peccary used in making coarse brushes for varnishing, scrubbing, &c.

26020. Series of bristles (black). B Nos. 1–12. William Wilkens & Co., Baltimore.
26021. " " " (white). B Nos. 1–13. " "
26026. " " " (yellow). B Nos. 1–12. " "
26027. " " " (red). B Nos. ½–11. " "
26028. " " " (black). D B Nos. ½–12. " "
26022. " " " (black). ("Casings") Nos. 1–12. " "
26023. " " " (natural black). ("Casings") Nos. 1–11. William Wilkens & Co.
26024. Series of bristles (white). ("Casings") Nos. 1–12. William Wilkens [& Co.
26025. " " " (white). Medium stiff, Nos. 1–12. "
26029. " " " (union). William Wilkens & Co.
26030. " " " (blue). "
26031. " " " (unbleached). "

Brushes made from bristles:

29327. Flat copying-brush, No. 1. Miles Brothers & Co.
29328. " " " No. 3½. "
29329. " " " No. 2. "
29330. " " " No. 2½. "
29331. " " " No. 3. "
29332. Round paint-brush, No. A ⅛. "
29333. " " " No. A ⅜. "
29334. " " " No. A 1. "
29335. " " " No. A 2. "
29336. " " " No. A 3. "
29337. Shaving-brush. "

Sheep's wool (on skin) used for blackboard-rubbers.[1]

Hair of deer and antelope (on skin) used by Indians for hair-brushes.[2]

Deer-hair brushes.

Brushes made from white hair in tail of deer (*Cariacus macrotis* and *C. virginianus*):

29354. Flat brush. 1 inch Miles Brothers & Co.
29355. " 1½ " "
29356. " 2 " "
29357. Round brush. "

[1] See exhibit in Educational Bureau.
[2] See Ethnological series.

Hair and bristles used for brushes.

Hair of horses, used for fly-brushes.

26032. Series of samples of horse-hair (dyed blue). William Wilkens & Co.
26033. " " " " " (dyed red). "
26034. " " " " " (dyed white). "

Ox-hair from the inside of cows' ears used for striping and lettering brushes.

29345–6–7–8–9–50. Fresco-painters' brushes, 1–6. Miles Brothers & Co.
29351. Series of ox-hair striping-pencils, sold as camel's-hair pencils. Miles Brothers & Co.

Hair used in other manufactures.

Bristles used in shoemakers' wax ends.
Bristles used in anatomical instruments.
Hair and bristles used in artificial flies. (See under B, 45.)
Hair of cattle used in strengthening mortar and plaster.

Hair used for stuffing.

Horse-hair, straight and curled, used for mattresses and cushions.
Refuse hair of beaver and musquash, cut from felting-hair, used for cushions.
(Down of rabbits used for cushions.)

Wool used as a medium for pigments.

Wool-flocking used in the manufacture of wall-paper, colored felts, and rubber cloth.

Chemical products.

Refuse human and other hair used in manufacture of prussiate of potash, with specimens of manufactured product.

22. Quills.

Quills of mammals.

Quills of American hedge-hog used by Indians in embroidering.

Quills of birds.

Quills of swan and turkey for engrossing-pens.
Quills of goose and eagle for writing-pens.
Quills of crow and duck for fine pens.
Quills used in making tooth-picks, fishing-floats, color-bottles, pencil-handles, needle-holders, &c.

23. Feathers.

Feathers used for clothing. (See under Furs, D 10.)

Feathers used for implements (including manufactured articles).

29528. Fan.

26596. Fan made from feathers of roseate spoonbill (*Platalea ajaja*). Mrs. C. E. Mott, Jacksonville, Fla.

26597. Fan made from feathers of white tern (*Sterna* sp.). Mrs. C. E. Mott, Jacksonville, Fla.

26598. Fan made from feathers of white crane (*Garzetta candidissima*). Mrs. C. E. Mott, Jacksonville, Fla.

26599. Fan made from feathers of blue heron (*Florida cærulea*). Mrs. C. E. Mott, Jacksonville, Fla.

26601–26605. Fan made from feathers of water-turkey (*Plotus anhinga*). Mrs. C. E. Mott, Jacksonville, Fla.

26602. Fan made from feathers of fish-crow (*Corvus ossifragus*) and blue heron (*Florida cærulea*). Mrs. C. E. Mott, Jacksonville, Fla.

26603. Fan made from feathers of wood ibis (*Tantalus loculator*) and parakeet (*Psittacus carolinensis*). Mrs. C. E. Mott, Jacksonville, Fla.

26606. Fan from miscellaneous feathers. Mrs. C. E. Mott, Jacksonville, Fla.

26812. Domestic turkey-feather dusters. 5 sizes. Chicago Feather-Duster Company. Chicago, Ill.

Feathers used for plumes and ornaments (including plumes, head-dresses, cockades, hat and dress trimmings, &c.)

26604. Bouquet made from feathers of Florida birds. Mrs. C. E. Mott, Jacksonville, Fla.

29529. Flowers made from feathers of Florida birds.

Feathers used in other manufactures.

Feathered arrow-shafts. (See under B, 18.)

Feathers used in making artificial flies.

Feathers used in manufacture of textile fabrics. (See under D, II, C.)

Down of birds.

Down of eider-duck used in bed-stuffing, with specimens of balls in which it is packed for transportation.

Down of other ducks.

Down of geese and swans used as stuffing for beds, and as electrical non-conductor in manufacture of philosophical instruments.

24. GELATINE AND ISINGLASS.

Gelatine.

Gelatine made from leather-shavings, bones, hoofs, and horns of bison, cattle, sheep, and other domestic animals, used in manufacture of glue, size, court-plaster, *papier glacé* for tracing, imitation glass, artificial flowers, and ornamental work, wrappings for confections, table-jelly (see under D 1), &c.

Glue.

25315. No. 1. Manufactured from horns and hoofs. Wm. H. Brown, Peabody, Mass.

25316. No. 2. Manufactured from horns and hoofs. Wm. H. Brown, Peabody, Mass.

Gelatine.

Size, or frozen glue.

25317–18. "A. A. E." Manufactured from horns and hoofs. Wm. H. Brown, Peabody, Mass.

Gelatines made from bone and ivory shavings.

Bird gelatine.

(Nests of esculent swallows (*Calocalia esculenta*, *C. fuciphaga*, *C. indifica*, &c.) exported from Indian Archipelago to China.)

Isinglass.

Isinglass (ichthyocolla), made from air-bladders and skins of fishes and used in the manufacture of fine glues and sizes, adhesive and court plasters, diamond cement, imitation glass, and table-jelly and confectionery (see under D 1, D), in refining wines and liquors, in adulterating milk, in fixing the luster of artificial pearls, and in lustering silk ribbons (embracing the dried bladders and the manufactured products) in their grades of "lyre," "heart-shaped," "leaf," and "book" isinglass.

Isinglass from sounds of cod and hake.

12123. Isinglass. (First quality.) Manufactured from sounds of cod, hake, &c. Cape Ann. Cape Ann Isinglass and Glue Company, Rockport, Mass.

12124. (Second quality.) Manufactured from sounds of hake, cod, &c. Cape Ann Isinglass and Glue Company, Rockport, Mass.

12126. Dried sound of cod (*Gadus morrhua*). Used in the manufacture of isinglass. George's Banks. Cape Ann Isinglass and Glue Company, Rockport, Mass.

12125. Dried sound of hake (*Phycis chuss*). Used in manufacture of isinglass. Bay of Fundy. Cape Ann Isinglass and Glue Company, Rockport, Mass.

16683. Sound of hake (*Phycis chuss*), used in the manufacture of isinglass. Portland, Me. H. Trefethern.

16684. Sound of hake (*Phycis chuss*), used in the manufacture of isinglass. Portland, Me. H. Trefethern.

25264. Isinglass. Manufactured from sounds of cod, hake, &c. Cape Ann Isinglass and Glue Company, Rockport, Mass.

25263. Air-bladder of cod (*Gadus morrhua*), used in manufacture of isinglass. Cape Ann Isinglass and Glue Company, Rockport, Mass.

25796. Isinglass made from skins of cod (*Gadus morrhua*). By a new method, by the Gloucester Isinglass and Glue Company. Wm. N. Le Paiz, agent, Boston, Mass.

25268. Air-bladder of "foreign crab" (species unknown), used in manufacture of isinglass. Cape Ann Isinglass and Glue Company, Rockport, Mass.

——. Air-bladder of foreign "sea trout" (an unknown fish), used in the manufacture of isinglass. East Indies. Cape Ann Isinglass and Glue Company, Rockport, Mass.

Isinglass.

Isinglass from sounds of cod and hake.

25794. Prepared glue made from skins of cod (*Gadus morrhua*). By Gloucester Isinglass and Glue Company. Wm. N. Le Paiz, agent, Boston, Mass.

25797. "Court-plaster" glue made from skins of cod (*Gadus morrhua*). By the Gloucester Isinglass and Glue Company. Wm. N. Le Paiz, agent, Boston, Mass.

25795. Glue made from skins of cod (*Gadus morrhua*). By Gloucester Isinglass and Glue Company. Wm. N. Le Paiz, agent, Boston, Mass.

20744. Dried tongues of fish (probably cod), used by Sitka Indians in making glue. Sitka, Alaska. J. G. Swan.

Isinglass from the squeteague family (*Sciænidae*), principally used by confectioners.

25265. Air-bladder of "beluga" (an unknown sciænoid fish), used in the manufacture of isinglass. Cape Ann Isinglass and Glue Company, Rockport, Mass.

25269. Air-bladder of hake (*Phycis chuss*), used in manufacture of isinglass. Cape Ann Isinglass and Glue Company, Rockport, Mass.

25312. Air-bladder of sciænoid fish, known to the trade as "tongue." East Indies. Cape Ann Isinglass and Glue Company, Rockport, Mass.

25267. Air-bladder of squeteague (*Cynoscion regalis*), used in manufacturing isinglass. Cape Ann Isinglass and Glue Company, Rockport, Mass.

12127. Dried sound of squeteague (*Cynoscion regalis*), used in the manufacture of isinglass. Long Island Sound. Cape Ann Isinglass and Glue Company, Rockport, Mass.

Isinglass.

12120. Isinglass made from sound of lake sturgeon (*Acipenser rubicundus*). Lake Erie. Schacht & Bros., Sandusky, Ohio.

25. Flexible materials derived from invertebrates.[1]

Insect productions.

Silk-worm "gut" used in making leaders for fish-lines.

(Nest of Cayenne-ant (*Formica bispinosa*), used as a mechanical styptic.)

Spiders' web used as a mechanical styptic and for the cross-lines in optical instruments. (See, also, under D, 8).

Papier maché of hornets' nests used for gun-wadding.

Mollusk productions.

Byssus of mollusks (see under D, 8).

[1] See under Part II of the present catalogue.

26. SPONGES.[1]

Specimens of American commercial sponges (with the different grades, and bleached sponges).

(Specimens of Mediterranean sponges.)

Surgical apparatus, probangs, aurilaves, "sponge-tents," and other instruments manufactured.

Spongeo-piline used as a substitute for poultices.

Sponges used in stuffing mattresses and cushions.

27. OILS AND FATS.

Mammal oils.

Bear-oil and bear-fat used as a cosmetic and in the manufacture of pomatums.

Dog-oil used in the manufacture of kid gloves.

Seal-oil, in its various grades, used for lubricating.

25059–60. Oil of seals (*Cystophora, Pagophylus, Pusa,* and *Phoca,* sp.). Newfoundland. Walter Grieve & Co., St. John's, N. F.

25061–3. Oil of seals (*Cystophora, Pagophilus, Pusa,* and *Phoca,* sp.). J. Munn & Co., Harbor Grace, N. F.

25979. Oil of harbor seal (*Phoca vitulina*). Capt. N. E. Atwood, Provincetown, Mass.

Sea-elephant oil.

25057. Oil of sea-elephant (*Macrorhinus,* sp.). Haven, Williams & Co., New London, Conn.

25058. Oil of sea-elephant (*Macrorhinus leonina*). South Georgia Island. Haven, Williams & Co., New London, Conn.

Sea-lion oil.

Manatee-oil.

Dugong-oil.

Oil and fat from domestic animals, (tallow, suet, lard, oil used in lamps, for lubricating, and neat's-foot oil used in dressing leather; also, manufactured into various substances (see D, 30), and tallow candles and night-lights.)

Oil from body of whales, grampuses, and porpoises used in the arts, for lubricating, painting, &c.

25054. Oil of humpback whale (*Megaptera,* sp.). Atlantic Ocean. Haven, Williams & Co., New London, Conn.

25055. Oil of right-whale. Haven, Williams & Co., New London, Conn.

25056. Oil of sulphur-bottom whale (*Sibbaldius,* sp.). Haven, Williams & Co., New London, Conn.

26038. Oil of beluga (*Delphinapterus catodon*). Renfrew & Co., Quebec.

24894. Crude Arctic whale oil. George Delano & Co.

24895. Bleached "winter" sperm-oil, from the sperm-whale (*Physeter macrocephalus*). George Delano & Co., New Bedford, Mass.

[1] See under Part II of the present catalogue.

Mammal oils.

Oil from whales and porpoises.

25743. Oil of grampus (*Grampus griseus*). Extracted by exposure to the sun. E. E. Small, Provincetown, Mass.

25067. Oil of grampus (*Grampus griseus*). Extracted by exposure to the sun. Capt. Caleb Cook, New Bedford, Mass.

25067. Double refined oil of grampus (*Grampus griseus*). Cape Cod. Capt. Caleb Cook, Provincetown, Mass.

25737. "Pressed" oil of grampus (*Grampus griseus*). E. E. Small, Provincetown, Mass.

25967. Oil of cowfish. Capt. N. E. Atwood, Provincetown, Mass.

25958. Oil of porpoise. Marvin Brothers & Bartlett, Portsmouth, N. H.

25738. Oil of porpoise (*Lagenorhynchus leucopleurus*). Extracted by exposure to the sun. E. E. Small, Provincetown, Mass.

25974. Oil of porpoise (*Delphinus erebennus?*). Capt. N. E. Atwood, Provincetown, Mass.

12116. Oil of harbor porpoise (*Phocæna americana*). Prepared by the Passamaquoddy Indians. Eastport, Me. Dr. E. Palmer.

12115. Oil of harbor porpoise (*Phocæna americana*). Eastport, Me. Dr. E. Palmer.

26037. Oil of harbor porpoise (*Phocæna americana*). Passamaquoddy Bay, Maine. George H. Peabody, Eastport, Me.

25739. Oil of snuffer (*Phocæna americana*). Extracted by exposure to the sun. E. E. Small, Provincetown, Mass.

24893. Crude "body"-oil from sperm-whale (*Physeter macrocephalus*). George Delano & Co., New Bedford, Mass.

26076. Oil of black-fish (*Globicephalus intermedius*). North American Oil Company, Wellfleet, Mass.

25741. Oil of black-fish (*Globicephalus melas*). E. E. Small, Provincetown, Mass.

25064. Refined oil of black-fish (*Globicephalus intermedius*). Cape Cod. Capt. Caleb Cook, Provincetown, Mass.

25065. Double refined oil of black-fish (*Globicephalus intermedius*). Cape Cod. Capt. Caleb Cook, Provincetown, Mass.

25977. Oil from body of black-fish (*Globicephalus melas*). Capt. N. E. Atwood, Provincetown, Mass.

Black-fish and porpoise-jaw oil used in lubricating fine machinery, watches, clocks, and guns, with specimens of blubber.

25742. Oil from head of black-fish (*Globicephalus melas*). Extracted by exposure to the sun. E. E. Small, Provincetown, Mass.

25968. Oil from head of black-fish (*Globicephalus melas*). Sold as "porpoise-jaw oil." Capt. Caleb Cook, Provincetown, Mass.

25984. Oil from head of black-fish (*Globicephalus melas*). Sold as "porpoise-jaw oil." Capt. N. E. Atwood, Provincetown, Mass.

25969. Oil from jaw of porpoise. Capt. N. E. Atwood, Provincetown, Mass.

26035–6. Oil from head of harbor-porpoise (*Phocæna americana*). Passamaquoddy Bay. Geo. A. Peabody, Eastport, Me.

26075. Head-oil of black-fish (*Globicephalus intermedius*). North American Oil Company, Wellfleet, Mass.

26035. Jaw-oil of porpoise (*Phocæna americana*). Passamaquoddy Bay. G. A. Peabody, Eastport, Me.

25066. Jaw-oil of black-fish (*Globicephalus intermedius*). Cape Cod. Capt. Caleb Cook, Provincetown, Mass.

Mammal oils.

Black-fish and porpoise jaw oil, &c.

26042. "Jaw-marrow" of black-fish (*Globicephalus melas*). E. E. Small, Provincetown, Mass.

25040. Blubber of black-fish and grampus (*Globicephalus melas* and *Grampus griseus*). E. E. Small, Provincetown, Mass.

26041. "Melon" blubber of black-fish (*Globicephalus melas*). E. E. Small, Provincetown, Mass.

25069. "Melon blubber" of black-fish (*Globicephalus intermedius*). Cape Cod. Capt. Caleb Cook, Provincetown, Mass.

Grampus-oil used for lubricating fine machinery.

25068. "Melon" blubber of grampus (*Grampus griseus*). Cape Cod. Capt. Caleb Cook, Provincetown, Mass.

25733. Oil from head of grampus (*Grampus griseus*). Extracted by exposure to the sun. E. E. Small, Provincetown, Mass.

Sperm-oil used in lamps, for lubricating, as an emollient in medicine, for lip-salves, and in the manufacture of spermaceti.

24892. Crude "head" sperm-oil from sperm-whale (*Physeter macrocephalus*). George Delano & Co., New Bedford, Mass.

25745. Crude sperm-oil from sperm-whale (*Physeter macrocephalus*). E. E. Small, Provincetown, Mass.

Spermaceti, with specimens of candles.

24896. Plain refined spermaceti from sperm-whale (*Physeter macrocephalus*). George Delano & Co., New Bedford, Mass.

24897. Spermaceti candles. George Delano & Co., New Bedford, Mass.

Manufactured glycerines, used as a preservative and antiseptic, as a cosmetic, as an emollient, as a substitute for cod-liver oil, in the manufacture of nitro-glycerine, dynamite, dualine, lithofracteur, coloniamite, and other explosives, soap, &c.

26798. Pure inodorous glycerine. Manufactured by H. Bower, Philadelphia. John Wyeth & Bro., Philadelphia.

Manufactured stearines, with candles and other manufactured articles.

Soaps manufactured from mammal-oil, soda-soaps (hard, toilet, and resin soaps), potash-soaps (washing, shaving, and soft soaps), diachylon plaster, &c.

Butter made from milk of cows, goats, and horses.

Oleomargarines, with specimens of imitation butter.

Brains of buffalo used in tanning by Indians.

Bird-oils.

(Oil of petrels and other sea-birds used by Eskimos and in the Azores for lamp-oil.)

Bird-oils.

Goose-oil used by watch-makers, and as an emollient.

Oil of pigeon (*Ectopistes migratorius*), used as food by Indians and frontiersmen.

Reptile-oils.

Alligator-oil manufactured in Florida.

24898. Oil of alligator (*Alligator mississippiensis*). Prepared by Col. L. A. Harden, Jacksonville, Fla. Dr. W. H. Babcock.

Turtle-oil made from turtle-eggs, used in dressing leather and in manufacture of soap.

Rattlesnake and other snake oils.

Fish-oils.

Sun-fish oil used by fishermen for cure of rheumatism.

25724. Oil from liver of sun-fish (*Mola rotunda*). Extracted by exposure to the sun. E. E. Small, Provincetown, Mass.

25959. Oil from liver of sun-fish (*Mola rotunda*). Marvin Brothers & Bartlett, Portsmouth, N. H.

25966. Oil from liver of sun-fish (*Mola rotunda*). Capt. N. E. Atwood, Provincetown, Mass.

Oil from liver of the cod family.

25982. Oil from liver of cod-fish (*Gadus morrhua*), crude. Capt. N. E. Atwood, Provincetown, Mass.

25960. Liver-oil of cod-fish (*Gadus morrhua*). Marvin Brothers & Bartlett, Portsmouth, N. H.

26550. Oil from liver of cod-fish (*Gadus morrhua*). Herbert M. Rodgers & Co., 11 Fulton Market, New York.

26551. Oil from liver of cod-fish (*Gadus morrhua*). Herbert M. Rodgers & Co., New York.

26707. Pure cod-liver oil. Prepared for medicinal use only, by Marvin Brothers, Portsmouth, N. H. John Wyeth, Philadelphia.

25985. Medicinal oil from livers of cod-fish (*Gadus morrhua*). Capt. N. E. Atwood, Provincetown, Mass.

25931. Stearine from liver-oil of cod-fish (*Gadus morrhua*). Marvin Brothers & Bartlett, Portsmouth, N. H.

25970. Oil from liver of cusk (*Brosmius vulgaris*). Capt. N. E. Atwood, Provincetown, Mass.

25736. Oil from liver of hake (*Phycis chuss*). Extracted by exposure to the sun. E. E. Small, Provincetown, Mass.

25732. Oil from liver of haddock (*Melanogrammus æglefinus*). Extracted by exposure to the sun. E. E. Small, Provincetown, Mass.

25978. Oil from liver of haddock (*Melanogrammus æglefinus*). Capt. N. E. Atwood, Provincetown, Mass.

25971. Oil from liver of pollock (*Pollachiuus carbonarius*). Capt. N. E. Atwood, Provincetown, Mass.

25740. Oil from liver of pollock (*Pollachiuus carbonarius*). Extracted by exposure to the sun. E. E. Small, Provincetown, Mass.

Fish-oils.

Herring-oil.

White-fish oil.

Sturgeon-oil.

Menhaden-oil used in currying leather, in rope making, for lubricating, for adulterating linseed-oil, as a paint-oil, and exported to Europe for use in the manufacture of soap and for smearing sheep.

26060. Oil of menhaden (*Brevoortia tyrannus*). Geo. W. Miles, Milford, Conn.

25744. Oil of pogie or menhaden (*Brevoortia tyrannus*), kettle-rendered. E. E. Small, Provincetown, Mass.

26077. Oil of pogie or menhaden (*Brevoortia tyrannus*). North American Oil Company, Wellfleet, Mass.

Oil of other fishes.

25973. Oil of horse-mackerel (*Orcynus secundidorsalis*). Capt. N. E. Atwood, Provincetown, Mass.

12117. Oil of herring (*Clupea harengus*). Capt. U. S. Treat, Eastport, Me.

12118. Oil from lake sturgeon (*Acipenser rubicundus*). Lake Erie. Schacht & Bros., Sandusky, Ohio.

25980. Oil from liver of mackerel-shark (*Isuropsis Dekayi*). Capt. N. E. Atwood, Provincetown, Mass.

25975. Oil from liver of thresher-shark (*Alopias vulpes*). Capt. N. E. Atwood, Provincetown, Mass.

25956. Oil from liver of dog-fish (*Squalus americanus*). Marion Bros. & Bartlett, Portsmouth, N. H.

25981. Oil from liver of dog-fish (*Squalus americanus*). Capt. N. E. Atwood, Provincetown, Mass.

25957. Oil from liver of skates (*Raia laevis*, &c.). Marion Bros. & Bartlett, Portsmouth, N. H.

25975. Oil from liver of cramp-fish (*Torpedo occidentalis*). Capt. N. E. Atwood, Provincetown, Mass.

25735. Oil from liver of cramp-fish (*Torpedo occidentalis*). E. E. Small, Provincetown, Mass.

26978. Sword-fish oil. Capt. N. E. Atwood, Provincetown, Mass.

26979. Mackerel-oil, " "

26980. Skate-oil. " "

26981. Halibut-oil. " "

Oulachan oil used by Indians of Northwest coast for food and illumination.

Soaps made from fish-oil.

28. PERFUMES.

Mammal perfumes.

Musk of musk-ox.

Musk of the musquash.

Castoreum of the beaver, including the various commercial grades, the Canadian, Hudson's Bay, and Russian castoreum, and specimens of castorine.

26057. Scent-glands of beaver (*Castor canadensis*). Nebraska. E. R. Squibb, M. D., Brooklyn, N. Y.

Mammal perfumes.

Hyraceum of the daman (*Hyrax capensis*).

Ambergris of sperm-whale, with specimens of ambreine.

26894. Ambergris (commercial). Weeks Potter, Boston.

Reptile perfumes.

Musk of alligator.

Oil of hawksbill and loggerhead turtles, used in perfumery.

29. COLORING MATERIALS.

Derived from mammals.

Bone-black.

Ivory-black (*noire d'ivoire*), used in fine painting, and in the manufacture of bank-note ink.

Prussiates, prussian blue, ferrocyanide of potassium, made from hoofs and refuse human and other hair.

26093. Red prussiate of potassa (*Potassium ferrocyanide*). E. R. Squibb, M. D., Brooklyn, N. Y.

26094. Yellow prussiate of potassa (*Potassium ferrocyanide*). E. R. Squibb, M. D., Brooklyn, N. Y.

26794. Yellow prussiate of potash. Manufactured by H. Bower, Philadelphia. John Wyeth, Philadelphia.

Gall of animals used in dyeing.

Dung of animals used in calico-printing.

Hæmatin made from blood, and used in turkey-red dyeworks, and for the red liquor of printers.

Wool-flocking (see under D, 21).

Derived from birds.

Shell of eggs used for white pigment.

Series of murexides or purpurate of ammonia dyes, made from guano.

26065. Murexid. Prepared by E. Merck, Darmstadt. E. R. Squibb, M. D., Brooklyn, N. Y.

Derived from fishes.

Essence d'Orient, or fish-scale pearl, used as a pigment.

26893. Essence d'Orient. Introduced for comparison. Gustave Bossange, Paris.

(Gall of carp, used in Turkey as a green paint and in staining paper.)

Derived from insects.

(Cochineal dye, from *Coccus cacti* of Mexico, used in manufacture of rouge, of carmine, and lake pigments, and in coloring tinctures.)

26064. Honduras silver cochineal. E. R. Squibb, Brooklyn, N. Y.

Derived from insects.

Canadian cochineal.
(Kermes and other cochineals of commerce, *Coccus ilicis.*)
Lac dye and lac lake, from *Coccus lacca, C. polonicus, C. uva-ursi,* and *Ophis fabæ.*
Dye prepared from bed-bug (*Cimex lectularius*).
(Dye prepared from *Trombidium*, in Guinea and Surinam.)
Nut-galls produced by insects, and used in tanning for black dyes, for woolen cloth, silk, and calico, and in manufacture of ink and gallic and pyrogallic acid, employed in photography.

Derived from mollusks.[1]

(*Sepia* from *Sepia officinalis.*)
Purple dyes from gasteropods, *Murex, Purpura,* &c.
Purple dyes from nudibranch mollusks.

30. CHEMICAL PRODUCTS AND AGENTS EMPLOYED IN ARTS AND MEDICINES.

Derived from mammals.

Secretion of skunk.
Album græcum of dogs used as a depilatory in tanning hides.
Albumen of blood, employed in sugar-refineries, in certain cements and pigments, and as an antidote and emollient.
Dung, used in calico-printing.
Gall of animals, used in mixing colors, in fixing the lines of crayon and pencil drawings, in preparing the surface of ivory for painting, in removing grease, and in medicine.
Pepsine and pancreatin, prepared from stomach of hogs and calves.

26796. Saccharated pepsin. John Wyeth & Bro., Philadelphia.
26795. Pancreatin, saccharated. " "
25964. Saccharine pepsin. E. Schaffer, Louisville, Ky.
25963. Dry pepsin (concentrated). E. Schaffer, Louisville, Ky.
25962. Pure pepsin. E. Schaffer, Louisville, Ky.
29262. Acid phospho-lactate or milk-phosphate. Prepared directly from milk, by Gail Borden & Co. New York Condensed Milk Company, New York.

Derived from insects.

Coccinella, used as remedy for toothache.
(Trehala, made from nests of beetles (*Larinas nidificans*), of East Indies, and used for a substitute for tapioca.)
Formic acid.
Carbazotic acid and its derivatives, made from sewing-silk scraps, and used as a substitute for quinine.

[1] See in Part II of the present catalogue.

Derived from insects.

Beeswax, used in manufacture of candles, cerates, plasters, and artificial flowers, in modeling and casting, and in medicine.

Honey, used as a preservative, a food, and in medicine as an aperient and demulcent.

19076. Sugar made of cane-lice. Prepared by the Cooyuwee Indians, Pyramid Lake, Nevada. Stephen Powers.

(Wax, used in Chinese pharmacy, secreted by the *Coccus pehlah.*)

(*a'*. Manna from the *Tamarix mannifera*, used as food, and in medicine as a purgative.

b'. Cedar manna from Mount Lebanon, from *Pinus cedrus.*

c'. Arabian manna, of *Hedysarum alliagi.*)

(Eye-powder, made by Chinese from the Telini fly (*Mylabris cichorii*) of India.)

Derived from mammals.

(Koumiss, a fermented liquor, prepared from mare's and cow's milk, and employed in medicines.)

Phosphorus, prepared from bones, with specimens of matches, vermin poisons, and other products.

Vaccine limph, derived from cows.

Ammonia, prepared from bones and horn.

Sal ammoniac, prepared from bones and dung.

Prussiates, prepared from hoof, horn, and leather waste, dried blood, hair, and wool, with specimens of blue cyanide of potassium. (See under Coloring Materials.)

Lime from bones and bone phosphates. (See, also, under 32.)

Punk and tinder, made from droppings of camel and bison.

Animal charcoal, used as a decolorizer.

Derived from birds.

Albumen of eggs, used in photography, in clarifying liquors, by physicians as emollients and antidotes, and by apothecaries in suspending oils and other liquids in water.

Egg-shells, employed as an antacid.

Derived from reptiles.

Crotalin of rattlesnake and copperhead.

(*Scincus officinalis* of Egypt, used by European practitioners as sudorific and stimulant.)

Derived from fishes.

Propylamine, made from fish-brine.

26066. Propylamine (manufactured by E. Merck, Darmstadt). E. R. Squibb, M. D., Brooklyn, N. Y.

Derived from fishes.

(Intestines of grayling, used by Laplanders as a substitute for rennet.)

Skins of eels, used by negroes for rheumatism.

Derived from insects.

Vesicatory preparations from American beetles, *Cantharis cinerea* and *C. vittata.*

Vesicatory preparations derived from foreign beetles, cantharides or Spanish flies (*Cantharis vesicatoria*), and other species, and substitutes, *Mylabris cichorii*, *Cercoma Schæfferi*, *Meloe*, sp., var., &c.

Vesicatory preparations from American spiders, such as *Tegenaria medicinalis.*

Gall-nuts, used in medicine (see under 29).

Derived from crustacea.

Salve-bug of fishermen of Banks (*Caligus curtus*), parasite on cod-fish.

Crabs' eyes, or concretions from stomach of astacus, used as an antacid.

Derived from worms.

American leech (*Macrobdella decora*), used in surgery.

(European leech (*Hirudo medicinalis*), introduced into America.)

(African leech (*Hirudo trochina*), introduced.)

Leeches used as barometers.

Derived from mollusks.

(Cuttle-fish bone of *Sepia officinalis.*) (See under D, III, H.)

Calcined shells, used for building-lime and in manufacture of dentifrices and enamel. (See under D, III, H.)

Derived from radiates.

a. Limes, derived from calcining coral and coral rock.

Derived from protozoans.

Burnt sponge, formerly used in medicine.

Infusorial earth and its applications. (See above under K.)

31. FERTILIZERS.

Natural guanos.

Bat guano from caves.

Bird guano from oceanic islands.

Artificial guanos.

Menhaden guano.

Series of preparations illustrating the manufacture of soluble Pacific guano. Soluble Pacific Guano Company, Wood's Holl, Mass.[1]

26104. Crude South Carolina phosphate.
25213, 26103. Crushed South Carolina phosphates.
26102. Ground South Carolina phosphate.
26100. Crude Navassa phosphate. Navassa Island, W. I.
26101. Sicily sulphur, used in manufacture of sulphuric acid, used in factory.
26099. Stassfurth kainite, used in preservation of scrap.
26095. Crude menhaden scrap.
26097. Menhaden scrap, dried by the Hogle patent drying-machine.
26095. Soluble Pacific guano (unscreened).
26098. Soluble Pacific guano (screened).

Other preparations.[1]

26062. Island guano. Geo. W. Miles, Milford, Conn.
26061–3. Ammoniated bone superphosphate. Geo. W. Miles, Milford, Conn.
22246. Leopoldshall kainite. Winfield S. Dunan, Baltimore, Md.

Dried meat and blood.

Dried blood.

22239. Black dried blood. Contains 16 per cent. ammonia. Winfield S. Dunan, Baltimore, Md.
22240. Black blood-dust. Contains 12 per cent. ammonia. Winfield S. Dunan, Baltimore, Md.
22241. Red blood-dust. Contains 14 per cent. of ammonia. Winfield S. Dunan, Baltimore, Md.
22242. Mixed dried blood. Contains about 13 per cent. of ammonia. Winfield S. Dunan, Baltimore, Md.
22243. Blood, bone, and meat tankage. Contains about 9.50 per cent. of ammonia and 24 per cent. bone-phosphate of lime. Winfield S. Dunan, Baltimore, Md.
22244. Azotin. Contains about 14 per cent. of ammonia, and is made from what are known as "butcher's cracklings"—the grease having been pressed out, the scrap is dried and ground. Winfield S. Dunan, Baltimore, Md.
22245. Sulphate of ammonia. Contains about 25 per cent. of ammonia. Winfield S. Dunan, Baltimore, Md.

Poudrettes.

Other animal fertilizers.

32. LIMES. (See under 30.)

33. OTHER MATERIALS NOT MENTIONED.

[1] An elaborate model of the works of the Soluble Pacific Guano Company of Wood's Holl, Mass., and Charleston, S. C., is on exhibition in the grounds of the Exposition.

SECTION E.

PROTECTION AND CULTURE.

I. INVESTIGATION.

1. METHODS OF THE UNITED STATES FISH COMMISSION.

Methods of work.

Apparatus for collecting specimens. (See under B.)

Apparatus for physical research.

Appliances for working up results.

This should include a model of coast laboratory with all its fittings.

Photographs.[1]

401. Headquarters of the United States Fish Commission, Wood's Holl, Mass.
400. Little Harbor of Wood's Holl, Mass., with headquarters of U. S. Fish Commission.
399. Harbor of Wood's Hole, Mass., from the wharf of the Fish Commission laboratory.
398. Harbor of Wood's Holl, Mass., with U. S. Fish Commission fleet for 1871.
397. Village of Wood's Holl, Mass., with the Pacific Soluble Guano Company's Works.
404. Yacht "Mazeppa," employed in the service of the U. S. Fish Commission.
403. U. S. steamer "Blue Light" at the wharf of the U. S. Fish Commission, Wood's Holl, Mass.
402. Village of Wood's Holl, Mass., showing laboratory of U. S. Fish Commission.

Results of work.

1. Reports of the Commission.

(UNITED STATES COMMISSION OF FISH AND FISHERIES. PART I.—REPORT ON THE CONDITION OF THE SEA-FISHERIES OF THE SOUTH COAST OF NEW ENGLAND IN 1871 AND 1872. By Spencer F. Baird, Commissioner. With supplementary papers. Washington: Government Printing-Office. 1873. 8vo, xlvii, 852 pp., 40 pl., with 38 explanatory (to pl. 1–38). 1 folded map.)

I. REPORT OF THE COMMISSIONER (S. F. Baird). pp. vii–xlvii.[2]

II. GENERAL PLAN OF INQUIRIES PROSECUTED. (1. MEMORANDA OF INQUIRY RELATIVE TO THE FOOD-FISHES OF THE UNITED STATES. 2. QUESTIONS RELATIVE TO THE FOOD-FISHES OF THE UNITED STATES.) pp. 1–6.

[1] The photographs here enumerated were on exhibition. Many others are in the possession of the Commission.

[2] This portion, with general title-page (pp. i–xlvii), was issued in advance separately.

Results of work.

1. Reports of the Commission.

(UNITED STATES COMMISSION OF FISH AND FISHERIES. PART I.)

III. TESTIMONY IN REGARD TO THE PRESENT CONDITION OF THE FISHERIES, TAKEN IN 1871. pp. 7–72.

IV. SPECIAL ARGUMENTS IN REGARD TO REGULATING THE SEA-FISHERIES BY LAW. pp. 73–103.

V. REPORTS OF STATE COMMISSIONS IN REGARD TO REGULATING THE SEA-FISHERIES. pp. 104–124.

VI. REPORT OF CONFERENCE OF THE UNITED STATES COMMISSIONER WITH THE COMMISSIONERS OF RHODE ISLAND AND MASSACHUSETTS, held October 5, 1871. pp. 125–131.

VII. DRAUGHT OF LAW PROPOSED FOR THE CONSIDERATION OF, AND ENACTMENT BY, THE LEGISLATURES OF MASSACHUSETTS, RHODE ISLAND, AND CONNECTICUT. pp. 132–134.

VIII. MISCELLANEOUS CORRESPONDENCE AND COMMUNICATIONS ON THE SUBJECT OF THE SEA-FISHERIES. pp. 134–138.

IX. EUROPEAN AUTHORITIES ON THE SUBJECT OF REGULATING THE FISHERIES BY LAW. pp. 139–148.

X. NOTICES IN REGARD TO THE ABUNDANCE OF FISH ON THE NEW ENGLAND COAST IN FORMER TIMES. pp. 149–172.

XI. STATISTICS OF FISH AND FISHERIES ON THE SOUTH SHORE OF NEW ENGLAND. pp. 173–181.

XII. SUPPLEMENTARY TESTIMONY AND INFORMATION RELATIVE TO THE CONDITION OF THE FISHERIES OF THE SOUTH SIDE OF NEW ENGLAND, TAKEN IN 1872. pp. 182–195.

XIII. PLEADINGS BEFORE THE SENATE COMMITTEE ON FISHERIES OF THE RHODE ISLAND LEGISLATURE, AT ITS JANUARY SESSION OF 1872. pp. 196–227.

XIV. NATURAL HISTORY OF SOME OF THE MORE IMPORTANT FOOD-FISHES OF THE SOUTH SHORE OF NEW ENGLAND, (viz: the Scup (*Stenotomus argyrops*), and the Blue-fish (*Pomatomus saltatrix*). pp. 228–252.

XV. DESCRIPTION OF APPARATUS USED IN CAPTURING FISH ON THE SEA-COAST AND LAKES OF THE UNITED STATES. pp. 253–274, with 19 (1–19) figs., and pl. (maps) xxxix and xl, and large folded map.

XVI. LIST OF PATENTS GRANTED BY THE UNITED STATES TO THE END OF 1872 FOR INVENTIONS CONNECTED WITH THE CAPTURE, UTILIZATION, OR CULTIVATION OF FISH AND MARINE ANIMALS. pp. 275–280.

XVII. LIST OF THE SEA-WEEDS OR MARINE ALGÆ OF THE SOUTH COAST OF NEW ENGLAND. By W. G. Farlow, M. D. pp. 281–294.

XVIII. REPORT UPON THE INVERTEBRATE ANIMALS OF VINEYARD SOUND AND THE ADJACENT WATERS, WITH AN ACCOUNT OF THE PHYSICAL CHARACTER OF THE REGION. By A. E. Verrill. pp. 295–778, with pl. i–xxxviii.

Results of work.

1. Reports of the Commission.

(UNITED STATES COMMISSION OF FISH AND FISHERIES. PART I.)

XIX. CATALOGUE OF THE FISHES OF THE EAST COAST OF NORTH AMERICA. By Theodore Gill. pp. 779–822.

XX. LIST OF FISHES COLLECTED AT WOOD'S HOLL (between June 20 and October 4). By S. F. Baird. pp. 823–827.

XXI. TABLE OF TEMPERATURES OF THE LITTLE HARBOR, WOOD'S HOLL, MASS., FROM JANUARY 1, 1873, TO DECEMBER 31, 1873. pp. 828–831.

XXII. LIST OF ILLUSTRATIONS. p. 833.

XXIII. GENERAL INDEX. pp. 835–852.

UNITED STATES COMMISSION OF FISH AND FISHERIES. PART II.—REPORT OF THE COMMISSIONER FOR 1872 AND 1873. A.—INQUIRY INTO THE DECREASE OF FOOD-FISHES. B.—THE PROPAGATION OF FOOD-FISHES IN THE WATERS OF THE UNITED STATES. By Spencer F. Baird, Commissioner. With supplementary papers. Washington: Government Printing-Office. 1874.

REPORT OF THE COMMISSIONER. (Table of contents precedes report.)

APPENDIX A.—THE FISHERIES OF THE GREAT LAKES AND THE SPECIES OF COREGONUS OR WHITEFISH.

I. REPORTS ON THE FISHERIES OF THE GREAT LAKES; THE RESULT OF INQUIRIES PROSECUTED IN 1871 AND 1872. By James W. Milner. (Table of contents on p. 77.)

II. MISCELLANEOUS NOTES AND CORRESPONDENCE RELATIVE TO THE WHITEFISH. pp. 79–88.

APPENDIX B.—THE SALMON AND THE TROUT (species of the *Salmo*). p. 89.

III. ON THE NORTH AMERICAN SPECIES OF SALMON AND TROUT. By George Suckley, Surgeon United States Army (written in 1861). p. 91. Tabulated list of species, pp. 92–159.

IV. THE SALMON OF THE DANUBE, OR THE HUCHO (*Salmo hucho*), AND ITS INTRODUCTION INTO AMERICAN WATERS. By Rudolph Hessel. p. 161.

V. IMPROVEMENT IN THE SALMON-FISHERIES OF SWEDEN. (Extract from the report of the Royal Swedish Intendant of Fisheries, 1868.) p. 166.

VI. REPORT OF OPERATIONS DURING 1872 AT THE UNITED STATES HATCHING ESTABLISHMENT ON MCCLOUD RIVER, AND ON THE CALIFORNIA SALMONIDÆ GENERALLY, WITH A LIST OF SPECIMENS COLLECTED. By Livingston Stone.

A. Introductory remarks. pp. 168–174.

B. The Salmonidæ of the Sacramento River. pp. 175–197.

C. Catalogue of natural-history specimens collected on the Pacific slope in 1872, by Livingston Stone, for the United States Fish Commission.

VII. NOTES ON THE SALMON OF THE MIRAMICHI RIVER. By Livingston Stone; p. 216. Fragmentary notes. p. 217.

VIII. THE SALMONIDÆ OF EASTERN MAINE, NEW BRUNSWICK, AND NOVA SCOTIA. By Charles Lanman. pp. 219–225.

IX. ON THE SALMON OF EASTERN NORTH AMERICA, AND ITS ARTIFICIAL CULTURE. By Charles G. Atkins. (Table of contents on p. 336.) p. 226.

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XI. THE LAKE TROUTS. By A. Leith Adams, M. A., &c. p. 357.

XII. ON THE SPECKLED TROUT OF UTAH LAKE. By Dr. H. C. Yarrow, U. S. A., Surgeon and Naturalist, &c. pp. 358–363.

XIII. MISCELLANEOUS NOTES AND CORRESPONDENCE RELATIVE TO SALMON AND TROUT. pp. 364–378.

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D. Ohio. p. 382.

E. Wisconsin. p. 383.

APPENDIX C.—THE SHAD AND ALEWIFE (species of *Clupeidæ*). p. 385.

XV. LETTERS REFERRING TO EXPERIMENTS OF W. C. DANIELL, M. D., IN INTRODUCING SHAD INTO THE ALABAMA RIVER. pp. 386, 387.

XVI. LETTERS REFERRING TO SHAD IN THE RIVERS TRIBUTARY TO THE GULF OF MEXICO. pp. 388–391.

XVII. REPORT OF A RECONNAISSANCE OF THE SHAD-RIVERS SOUTH OF THE POTOMAC. By H. C. Yarrow, M. D. pp. 396–401.

XVIII. REPORT ON SHAD-HATCHING OPERATIONS. pp. 403–417.

XIX. REPORT ON THE PROPAGATION OF THE SHAD (*Alosa Sapidissma*), AND ITS INTRODUCTION INTO NEW WATERS BY THE UNITED STATES COMMISSIONER, IN 1873. By James W. Milner. pp. 419–450.

XX. NOTES ON THE NATURAL HISTORY OF THE SHAD AND ALEWIFE. pp. 452–462.

APPENDIX D.—FISH CULTURE (THE HISTORY, THEORY, AND PRACTICE OF FISH-CULTURE). pp. 463, 464.

XXI. THE HISTORY OF FISH-CULTURE. p. 465.

A. The history of fish-culture in Europe, from its earlier record to 1854. By Jules Haime. pp. 465–492.

B. Report on the progress of pisciculture in Russia. By Theodore Soudakèvicz. pp. 493–512.

C. Report on the state of pisciculture in France and the neighboring countries. By M. Bouchon-Brandley, assistant secretary of the College of France. pp. 513–522.

D. The progress of fish-culture in the United States. By James W. Milner. pp. 523–558.

E. Alphabetical list of American fish-culturists and of persons known as being interested in fish-culture. pp. 558–566.

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1. Reports of the Commission.

(UNITED STATES COMMISSION OF FISH AND FISHERIES. PART II.)

XXII. PAPERS RELATING TO PRACTICAL FISH-CULTURE.

A. Method of treating adhesive eggs of certain fishes, especially of the Cyprinidæ, in artificial propagation. By Rudolph Hessel. pp. 567–570.

B. On the so-called "dry" method of impregnating spawn. By Alexander Stenzel, inspector of fisheries in Silesia, Germany. pp. 571–574.

C. Fish-culture in salt or brackish waters. By Theodore Lyman, Fish Commissioner of Massachusetts. pp. 575–577.

D. Descriptions of improved apparatus in fish-hatching. pp. 578–587.

APPENDIX E.—OBSTRUCTIONS TO THE UPWARD MOVEMENT OF FISHES IN STREAMS, AND THE REMEDY. pp. 588, 589.

XXIII. ON FISH-WAYS. By Charles G. Atkins. pp. 591–615.

XXIV. ON OBSTRUCTIONS TO THE ASCENT OF FISH IN CERTAIN RIVERS. p. 617.

A. Obstructions in the rivers of Maine. By E. M. Stillwell. pp. 617–621.

B. Obstructions in the tributaries of Lake Champlain. By M. C. Edmunds. pp. 622–627.

C. Obstructions in some of the rivers of Virginia. By M. McKennie. pp. 628–629.

D. Character of the streams on the northern shore of Lake Michigan. By J. F. Ingalls. pp. 630–632.

E. Characters of some of the northern tributaries of Lake Michigan. By James W. Milner. pp. 632–634.

APPENDIX F.—NATURAL HISTORY. pp. 635–636.

XXV. THE CRUSTACEA OF THE FRESH WATERS OF THE UNITED STATES. By Sidney I. Smith.

A. Synopsis of the higher fresh-water Crustacea of the Northern United States. pp. 637–657.

B. The crustacean parasites of the fresh-water fishes of the United States. pp. 661–665.

XXVI. SYNOPSIS OF THE NORTH AMERICAN FRESH-WATER LEECHES. By A. E. Verrill. pp. 666–689.

XXVII. SKETCH OF THE INVERTEBRATE FAUNA OF LAKE SUPERIOR. By Sidney I. Smith. pp. 690–706.

XXVIII. FOOD OF FRESH-WATER FISHES. By Sidney I. Smith. pp. 708–709.

XXIX. NATURAL AND ECONOMICAL HISTORY OF THE GOURAMI (Osphromenus goramy). By Theodore Gill. p. 710.

A. Natural history. pp. 710–717.

B. The introduction and attempts to introduce the gourami into foreign countries. pp. 718–725.

C. Rules for transportation and introduction. p. 727.

XXX. NOTES ON THE GRAYLING (*Thymallus*) OF NORTH AMERICA. By James W. Milner. pp. 729–742

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XXXI. TEMPERATURE IN THE GULF OF MEXICO, FROM RECORDS OF THE UNITED STATES COAST SURVEY. pp. 745–748.

XXXII. CORRESPONDENCE WITH COMPANIES RELATIVE TO FACILITIES IN TRANSPORTATION, ETC. pp. 749–756.

XXXIII. REPORTS OF SPECIAL CONFERENCES WITH AMERICAN FISH-CULTURISTS' ASSOCIATION AND STATE COMMISSIONERS OF FISHERIES. p. 757.

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B. Meeting at New York, October 17, 1872. pp. 763–773.

XXXIV. BIBLIOGRAPHY OF REPORTS OF FISHERY COMMISSIONS. By Theodore Gill. pp. 764–773.

A. Names of Commissioners. p. 774.

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APPENDIX A.—SEA-FISHERIES AND THE FISHES AND INVERTEBRATES USED AS FOOD.

I. HISTORICAL OBSERVATIONS ON THE CONDITION OF THE FISHERIES AMONG THE ANCIENT GREEKS AND ROMANS AND THEIR MODE OF SALTING AND PACKING FISH. By J. K. Smidlo. pp. 1, 2.

II. STATISTICS OF THE MOST IMPORTANT FISHERIES OF THE NORTH ATLANTIC. By Carl Dambeck. pp. 3–24.

III. ON THE FISHERIES OF NORWAY. pp. 24–30.

IV. STATISTICAL DATA REGARDING THE SWEDISH FISHERIES. pp. 31–34.

V. ACCOUNT OF THE FISHERIES AND SEAL-HUNTING IN THE WHITE SEA, THE ARCTIC OCEAN, AND THE CASPIAN SEA. By Alexander Schultz. pp. 35, 96.

VI. THE NORWEGIAN HERRING-FISHERIES. By A. J. Breck and A. Fadderdin. pp. 97–122.

VII. PRELIMINARY REPORT FOR 1873–74 ON THE HERRING AND THE HERRING-FISHERIES ON THE WEST COAST OF SWEDEN. By Axel Vilhelm Springman. pp. 123–168.

VIII. THE HALIBUT FISHERIES OF THE UNITED STATES. By Lieut. P. De Broca. pp. 169–172.

IX. THE FISHING VILLAGES SNIKKERSTUN AND SKOLTERUP, AND THE COLLECTION OF FISHING IMPLEMENTS EXHIBITED BY THEM AT ELSINORE, DENMARK, DURING THE SUMMER OF 1872. pp. 173–182.

X. ON THE HERRING AND ITS PREPARATION AS AN ARTICLE OF TRADE. By Hyalmar Widigner. pp. 183–192.

XI. NEW CONTRIBUTIONS TO THE HERRING QUESTION—THE DISPUTE BETWEEN AXEL BŒCK AND OSSIAN SARS REGARDING THE NORWEGIAN SUMMER HERRING—SARS' RECENT OBSERVATIONS AND HIS NEW THEORY ON THE MIGRATION OF THE HERRING. pp. 193–194.

Results of work.

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XIV. TRANSPORTATION OF LOBSTERS TO CALIFORNIA. pp. 253–257.

XV. ON THE ARTIFICIAL PROPAGATION OF THE LOBSTER. pp. 258–266.

XVI. ON THE OYSTER INDUSTRIES OF THE UNITED STATES. By Lieut. P. De Broca. pp. 267–320.

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XVIII. REPORT OF THE TRIANA TRIP. By J. W. Milner. pp. 351–362.

XIX. ON THE TRANSPORTATION OF SHAD FOR LONG DISTANCES. pp. 363–371.

XX. REPORT OF OPERATIONS IN CALIFORNIA IN 1873. By Livingston Stone. pp. 372–427.

XXI. HATCHING AND DISTRIBUTION OF CALIFORNIA SALMON. pp. 428–436.

XXII. REPORT OF OPERATIONS DURING 1874 AT THE UNITED STATES SALMON-HATCHING ESTABLISHMENT ON THE MCCLOUD RIVER, CALIFORNIA. By Livingston Stone. pp. 437–476.

XXIII. CORRESPONDENCE RELATING TO THE SAN JOAQUIN RIVER AND ITS FISHES. pp. 477–484.

XXIV. THE ATLANTIC SALMON (*Salmo Salar*). By A. G. Atkins. pp. 485–539.

APPENDIX C.—FISH-CULTURE, RELATING MORE ESPECIALLY TO SPECIES OF (*Cyprinidæ*). pp. 540.

XXV. NOTES ON PISCICULTURE IN KIANG SI. By H. Kopsch. pp. 543–548.

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XXVII. THE GOLD ORFE (*Cyprinus orfus*). pp. 559–562.

XXVIII. DIRECTIONS FOR USING TABLES FOR RECORDING THE PROPAGATION AND DISTRIBUTION OF FISH. pp. 563–568.

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XXIX. FISHERIES AND FISHING LAWS IN AUSTRIA AND THE WORLD IN GENERAL. By Carl Peyrer. pp. 571–680.

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APPENDIX E.—NATURAL HISTORY. pp. 685–686.

XXXI. PRELIMINARY REPORT ON A SERIES OF DREDGINGS MADE ON THE UNITED STATES COAST SURVEY STEAMER BACHE IN THE GULF OF MAINE. By A. S. Packard, jr., M. D. pp. 687–690.

XXXII. LIST OF THE MARINE ALGÆ OF THE UNITED STATES. By W. G. Farlow. pp. 691–718.

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1. Reports of the Commission.

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XXXIII. SECTION ON THE ORGANS OF REPRODUCTION AND THE FECUNDATION OF FISHES AND ESPECIALLY OF EELS. By Dr. Syvski. pp. 719–734.

XXXIV. THE FOOD AND MODE OF LIVING OF THE SALMON, THE TROUT, AND THE SHAD. By D. Barfurth. pp. 735–778.

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I. REPORT OF THE COMMISSIONER.

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B.—INQUIRY INTO THE DECREASE OF FOOD-FISHES.

2. INVESTIGATIONS AND OPERATIONS OF 1875. p. 4.

3. INVESTIGATIONS AND OPERATIONS OF 1876. p. 7.

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The California salmon. p. 21.
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I. HISTORY OF THE AMERICAN WHALE FISHERY FROM ITS EARLIEST INCEPTION TO THE YEAR 1876. By Alexander Starbuck.

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II. FISHERIES OF CHICAGO AND VICINITY. By E. W. Nelson. p. 783.

III. THE SALMON FISHERIES OF THE COLUMBIA RIVER. By Livingston Stone. p. 801.

IV. NOTES ON SOME FISHERIES ON THE DELAWARE RIVER. By Dr. C. C. Abbott. p. 825.

V. METHOD OF PURIFYING THE RESIDUUM OF GAS-WORKS BEFORE ALLOWING IT TO PASS OFF INTO THE WATER. By J. R. Shotwell. p. 847.

VI. TABLES OF TEMPERATURES OF AIR AND WATER AT SUNDRY STATIONS OF THE UNITED STATES SIGNAL OFFICE, FROM MARCH, 1874, TO FEBRUARY, 1875, AND FROM MARCH, 1876, TO FEBRUARY, 1877, INCLUSIVE. p. 851.

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VIII. THE PROPAGATION AND DISTRIBUTION OF SHAD. Jas. W. Milner. p. 901.

IX. ON THE COLLECTION OF EGGS OF SCHOODIC SALMON IN 1875 AND 1876. By Charles G. Atkins. p. 910.

X. OPERATIONS ON THE McCLOUD RIVER IN SALMON-BREEDING IN 1875. By Livingston Stone. p. 921.

XI. OPERATIONS ON THE McCLOUD RIVER IN SALMON-BREEDING IN 1876. By Livingston Stone. p. 935.

XII. CORRESPONDENCE RELATING TO THE EXPORTATION OF FISH-HATCHING APPARATUS TO NEW ZEALAND, GERMANY, &C. p. 959.

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2. COLLECTIONS. (See under A, V to VIII.)

Photographs.

See series of photographs and color-sketches of North American fishes.

Upwards of four hundred casts of coast and fresh-water species.

(See under A, V to VIII.)

II. PROTECTION.

2. PRESERVATION OF GAME, FISH, ETC.

* *From man.*

Game laws.

** *From artificial obstructions.*

Fish-ways.

Gap fish-ways.
French, ditch, or "Cape Cod" fish-ways.
Oblique groove fish-ways.
Single groove.

15355. Model of fish-way. James D. Brewer, inventor, Muncy, Lycoming County, Pa.

15356. Model of fish-way. James D. Brewer, Muncy, Pa.

Fish-ways.

Step fish-ways.

Box or pool fish-ways.

26108. Model of fish-way. Jas. D. Brewer, Muncy, Pa. Patented by Daniel Steck.

Steps contrived by arrangement of rocks and bowlders.

25701. Model of Duncanson fish way. J. T. Rothe.

Inclined plane without steps.

29283. Model of old Pennsylvania fish-way. Built at Columbia, on the Susquehanna River, in 1866. Designed by James Worral. Scale, ½ inch to the foot. C. G. Atkins, Bucksport, Me.

29284. Model of old Pennsylvania fish-way. Built at Columbia, on the Susquehanna River, in 1873. Designed by James Worral. Scale, ½ inch to the foot. C. G. Atkins, Bucksport, Me.

With partitions at right angles.

29291. Model of rectangular return fish-way. Scale, ½ inch to the foot. C. G. Atkins, Bucksport, Me.

Brackett's patent fish-way.

29285. Brackett's patent fish-way. Scale, ½ inch to the foot. C. G. Atkins, Bucksport, Me.

29037. Model of the fish-way at Holyoke, Mass., on the Connecticut River. Scale, ½ of an inch to the foot (1/96). C. G. Atkins.

This fish-way is on the Brackett plan. A submerged piece of cob-work surmounted by a grating serves to turn the fish into the fish-way. It carries a column of water 2 feet wide and 2 feet deep which reaches the bottom with no perceptible increase in velocity, the current being less than 2 miles an hour. Height of the dam, 30 feet; length of the fish-way, 440 feet; the incline, 1 in 15.

With oblique partitions.

29287. An adaptation of Foster's fish-way. Designed by C. G. Atkins, and built at Pembroke, Me. Scale, ½ inch to the foot. C. G. Atkins, Bucksport, Me.

29286. Model of Foster's fish-way. Invented by H. H. Foster, E. Machias, Me. Scale, ½ inch to the foot. C. G. Atkins, Bucksport, Me.

29288. Model of oblique fish-way. Invented by Alfred Swazey, Bucksport, Me., in 1876. Scale, ½ inch to the foot. C. G. Atkins, Bucksport, Me.

29289. Swazey's oblique fish-way. Invented by Alfred Swazey, Bucksport, Me., in 1874. Scale, ½ inch to the foot. C. G. Atkins, Bucksport, Me.

29290. Model of Swazey & Atkins's fish-way. Invented by Alfred Swazey and C. G. Atkins, Bucksport, Me., in 1874. Scale, ½ inch to the foot. C. G. Atkins, Bucksport, Me.

——. Model of the McDonald fish-way. M. McDonald, Lexington, Va.

26939. No. 15. Model of the fish-way at Lawrence, Mass., on the Merrimack River Scale, ½ inch to the foot (1/96). C. G. Atkins.

Fish-ways.

With rectangular compartments.

26937. Model of rectangular compartment fish-way on the inclined-plane system, in an extended arrangement. Scale, ½ inch to the foot (1/24). C. G. Atkins.

Spiral fish-ways.

26949. No. 11. Model of rectangular compartment fish-way on the inclined-plane system, in spiral arrangement, devised by Charles G. Atkins, of Bucksport, Me., in imitation of Pike's spiral fish-way. Scale, ½ inch to the foot (1/24). C. G. Atkins.

This model represents a fish-way precisely the same capacity and slope, and adapted to a dam of the same height as No. 10, showing the great economy of space and material effected by the spiral arrangement. Further advantages of the spiral arrangement are the facility with which water can be admitted at different heights of the river, and contiguity of the outlet to the dam secured, so that the fish will readily find it.

26931. Model of Pike's spiral fish-way, devised by Hon. R. G. Pike, of Connecticut. Sale, ½ inch to the foot (1/24). C. G. Atkins.

The advantages of this, the first spiral arrangement invented in America, are the same as those claimed for that arrangement in Pike's spiral fish-way.

Moving float fish-ways.

26930. Model of Everleth's fish-way, devised by F. M. Everleth, M. D., of Waldorboro', Me. Scale, ½ inch to the foot (1/24). C. G. Atkins.

The peculiarity of this fish-way is the movable attachment at the upper end, which, by its own buoyancy, rises and falls with the fluctuations of the river, thus insuring that the entrance shall always be at the right height to admit the requisite quantity of water.

*** *From natural enemies.*

Apparatus for destroying injurious species.

Oyster-bed tangles. (See under B, 12.)

Tethers and hopples.

Cages and pens.

Kennels for dogs, &c.
Cages for animals.
Cages for birds.
Cages for insects.

5631. Cages for fire-flies. West Indies. Miss Septimia Randolph.

Fish-cars and other floating cages for aquatic animals.

29539. Model of fish-marketman's car. For preservation of living fish. J. M. K. Southwick, Newport, R. I.

22221. Model of Providence River fish-car. These are towed by the smack, and as fast as fish are caught they are put into it, and so kept for Providence market. D. D. Almy.

29397. Model of Noank lobster-car. Capt. H. C. Chester.

29538. Model of fisherman's car for transporting living fish to market. J. M. K. Southwick, Newport, R. I.

26933. Model of a boat used in transporting living salmon at the United States salmon-breeding station at Bucksport, Me. Scale, 1 inch to the foot ($\frac{1}{2}$). C. G. Atkins.

When in use the boat is depressed until full of water, a number of salmon, sometimes as many as 30, are placed in it, and it is then towed after another boat, the motion insuring a constant change of water, which passes in at the forward ports and out at the after ports. The net and grating prevent the escape of the salmon, and the cloth shuts out the sight of anything that might frighten them.

Aquaria.

Globes.
Aquaria.

Hives and other cages for insects.
Live-boxes, troughs, &c., for microscopists' use.
Fish-ponds, fish-farms (models).

29278. Parlor trout-brook. Stone & Hooper, Charlestown, N. H.

29380. Rearing-box. Stone & Hooper, Charlestown, N. H.

4. ENEMIES OF USEFUL ANIMALS.

Intestinal worms and other internal parasites.[1]
Fish-lice, barnacles, and other external parasites.[1]
Predatory animals not elsewhere exhibited.

III. PROPAGATION.

5. PROPAGATION OF MAMMALS.

Methods of mink culture.
Methods of culture of domesticated animals.

6. PROPAGATION OF BIRDS.

Methods of ostrich culture.
Methods of culture of domesticated birds, fowls, &c.

[1] See in Part II of the present catalogue.

7. PROPAGATION OF REPTILES.

Methods of terrapin culture.

8. PROPAGATION OF AMPHIBIANS.

Methods of frog culture.

9. PROPAGATION AND CULTURE OF FISHES.[1]

Accessories of obtaining and impregnating ova.

Pans, pails, &c.
Strait-jackets used in spawning salmon.
Spawning-race (Ainsworth).
Roller spawning-screen (Collins).
Spawning-vat (Bond).

Hatching-apparatus.

26940. No. 19. Model of hatching-house at United States salmon-breeding station at Bucksport, Me. Scale, ½ inch to the foot (1/24). C. G. Atkins.

The hatching-troughs are arranged in sets of four across the building, and fitted with Brackett trays. The water enters them from a feed-trough along the side of the room and escapes by pipes through the floor.

Troughs:
Plain.
Gravel-bottomed.
With sieve-bottom trays.

26933. No. 20. Model of hatching-troughs and trays in use at the United States salmon-breeding stations at Bucksport and Grand Lake Stream, Me. Scale, full size. C. G. Atkins.

The eggs to be hatched are placed on the wire-cloth trays.

26935. Model of hatching-frame in use at Grand Lake Stream, adapted to use in a trough or in an open stream. Devised by C. G. Atkins. Scale, full size. C. G. Atkins.

The eggs are placed on all of the trays except the upper one. The interstices, though too small for the escape of the eggs, permit a change of water, and when the frame is shut it confines the trays securely in place.

26970. Model of hatching-apparatus for black-bass. John Roth, Duncannon, Pa.

Brackett's.
Williamson's.
Clark's.
Vats or cases:
Holton's.
Roth's.

[1] Many of these articles cannot conveniently be exhibited.

Hatching-apparatus.

Glass-grilled boxes (Coste's).

26995. Coste hatching-tray. Mrs. J. H. Slack, Troutdale, N. Y.

Jars and tin vessels.

22247. Shad-hatching can. Invention of Fred. Mather. U. S. Fish Commission.
26909. Ferguson aquarium-jar. T. B. Ferguson, Baltimore, Md.
22250. Ferguson's fish-hatching can. " "
26998. Ferguson's hatching jar. " "

Hatching-boxes (floating).

26903. Shad-hatching box. Seth Green's patent. U. S. Fish Commission.
26997. Shad-hatching box. Seth Green's patent. Seth Green, Rochester, N. Y.
26904. Shad-hatching box. Brackett's patent. U. S. Fish Commission.
26962. Shad-hatching box. Brackett's patent. E. A. Brackett, Winchester, Mass.
26905. Shad-hatching box (No. 2). Brackett's patent. U. S. Fish Commission.
26906. Shad-hatching box. Bryant's patent. U. S. Fish Commission.
26907. Shad-hatching box. Stillwell & Atkins's patent. U. S. Fish Commission.
26908. Shad-hatching box. Bannister's design. U. S. Fish Commission.
26955. Hatching apparatus. N. W. Clark, Clarkston, Mich.
——. Shad hatching-box (model). J. C. House & O. A. McClain, Washington, D. C.

Adhesive eggs apparatus:

Vertical wire-cloth trays.

Hatching-basket.

26956. Salmon egg hatching-baskets. McCloud River, California. Livingston Stone.

Brook-shanty (Furman's).

(Bay or cove barriers, Professor Rasch's.)

Accessories:

Tanks.
Nests.
Trays.
Grilles.
Gravel-filters.
Flannel screens.
Shallow troughs or tables (for picking eggs).
Egg-nippers.

26915. Wooden nippers. Fred. Mather, Honeoye Falls, N. Y.
25955. Brass egg-nippers. Frank N. Clark, Northville, Mich.

Cribbles.
Pipettes.
Skimmer-nets.

Hatching-apparatus.

Accessories:

Feathering quills and brushes.
Rose-nozzles (for washing eggs).
Syringes, bulb, &c.
Shallow pans.
Aerating-pipe.

Transporting apparatus.

Apparatus for transporting eggs:

Cans.
Case of cups (Wilmot's).
Case of cups (Clark's).
Case of trays (Clark's).
Moss-crates (Stone's).

25025. Moss-crates for transportation of eggs of Sacramento salmon across the continent. Livingston Stone, Charlestown, N. H.

Apparatus for transporting fish:

Barrels.
Cans, plain.

26911. Milk-can, used in transportation. U. S. Fish Commission.
29377. Conical tank. Stone & Hooper, Charlestown, N. H.
26910. Conical can. Livingston Stone, Charlestown, N. H.

Cans with aerating accessories:

26914. Tank for ocean transportation. Invention of Fred. Mather. U. S. Fish Commission.
29379. Transporting-tank. Stone & Hooper, Charlestown, N. H.
26881. Transporting-can. C. W. Rogers, Waukegan, Ill.
26932. Model of box used in the transportation of living salmon at the United States salmon-breeding station at Bucksport, Me. Scale, 2 inches to the foot ($\frac{1}{6}$). C. G. Atkins.
When in use the box is filled with water and from 5 to 7 salmon placed in it and carted a mile.

Slack's.
Clark's.
M. A. Green's.

Tanks, with attachment of band-wheel to car-axle (Stone's).
(Tanks, with Freiburg aerating apparatus.)
Aquarium-car (Stone's).
Live-box (Atkins's).
Accessories:

Air force-pumps.
Siphon-tubes.

26912. Rubber siphon-tube. U. S. Fish Commission.
26913. Aerating-rose, with siphon. U. S. Fish Commission.

Transporting apparatus.

Accessories:

Bellows.

Dipping apparatus.

26934. Model of dipping-bag used instead of a dip-net in handling salmon at the United States salmon-breeding station at Bucksport, Me. Scale, 1 inch to the foot ($\frac{1}{12}$). C. G. Atkins.

10. PROPAGATION OF INSECTS.

Propagation of silk-worm.

Specimens of plants used for food.

Model of house and its appliances.

Propagation of cochineal insect.

Propagation of bees.

For hives see under E, 3.

11. PROPAGATION OF WORMS.

Propagation of leeches.

12. PROPAGATION OF MOLLUSKS.

Methods of oyster culture.

Stools for receiving spat, natural and artificial.

Other apparatus.

13. PROPAGATION OF CORALS.

14. PROPAGATION OF SPONGES.

PART II.

CATALOGUE OF ILLUSTRATIONS

OF THE

ECONOMICAL INVERTEBRATES

OF

THE AMERICAN COASTS.

BY

W. H. DALL.

CATALOGUE OF ILLUSTRATIONS OF THE ECONOMICAL INVERTEBRATES OF THE AMERICAN COASTS.

MOLLUSCA.

Mollusca cephalopoda.—SQUIDS AND CUTTLES.

32905. Sepia "bone," or endosteum, in natural condition. East coast of the United States. Uses: Fed to cage-birds requiring lime.

32905*a*. Pounce: Powdered sepia-bone; used in rewriting over erasures to prevent blotting, in medicine as an antacid.

33005. Cuttle-fish (*Octopus punctatus*, Gabb). California to Alaska. Used for bait in the cod-fishery, and by the natives for food. W. H. Dall.

25972. Oil of squid (*Ommastrephes illecebrosa*). Capt. N. E. Atwood, Provincetown, Mass.

Mollusca gasteropoda.—SEA-SNAILS, &c.

A. Useful:

1. Used for food or bait:

32885. Velvet chiton (*Cryptochiton stelleri*). Alaska to California. Indian food. W. H. Dall.

32886. Coat-of-mail shell (*Katherina tunicata*). Alaska to California. Indian food. W. H. Dall.

32883. Limpet (*Acmæa testudinalis*). Connecticut to Labrador. W. H. Dall.

32904. Western limpet (*Acmæa patina*). Alaska to California. W. H. Dall.

32880. Rockwinkle (*Litorina subtenebrosa*). Alaska to Oregon. W. H. Dall.

32882. Periwinkle (*Purpura canaliculata*). Alaska to California. W. H. Dall.

32884. Periwinkle (*Purpura ostrina*). California. W. H. Dall.

32903. Periwinkle (*Purpura lapillus*). Cape Cod to Labrador. W. H. Dall.

2. Useful by producing pearl-shell, &c.:

32830. Turban-shell (*Trochiscus norrissii*). California. H. Hemphill.

32832. Top-shell (*Pomaulax undosum*), in natural state. California. H. Hemphill.

32831. Top-shell, prepared to show pearly layers. California. H. Hemphill.

29301. Manufactured state of various kinds of American pearl-shells derived from gasteropods or sea-snails. Furnished by A. B. De Frece & Co., 428 Broadway, New York.

32838. Sea-ears (*Haliotis Kamchatkana*), affording pearl-shell and food. Alaska. J. G. Swan.

32890. Rough sea-ear (*H. corrugata*). Southern California. Used for pearl-shell and for food. Specimen in natural condition. W. H. Dall.
——. Rough sea-ear. Specimen ground and polished to show pearly layers. J. T. Ames.
32900. Red sea-ear or abalone (*H. rufescens*). Monterey, Cal. Used for pearl-shell and for food. Specimens in natural condition. H. Hemphill.
——. Red sea-ear. Polished specimen showing pearly layers. J. T. Ames.
——. Red sea-ear. Fleshy portion prepared and dried for food by California Chinese. Chinese market, California. H. Hemphill.
32823. White abalone (*H. crackerodii*), producing pearl-shell and food. Natural state. California. Paul Schumacher.
32899. White abalone. Natural state. Monterey, Cal. H. Hemphill.
——. White abalone. Polished to show pearly layers. Jas. T. Ames.
4792. White abalone. Polished specimens.
32821. Splendid sea-ear (*H. splendens*) affording food and pearl-shell. California. Paul Schumacher.
32898. Splendid sea-ear. Natural condition. Southern California. H. Hemphill.
——. Splendid sea-ear. Polished to show pearly layers. J. T. Ames.
——. Splendid sea-ear. Young specimen polished. J. T. Ames.
29302. Manufactures of *Haliotis* shell, showing application in the arts. Furnished by A. B. De Freco & Co., 428 Broadway, New York.
29248. Ditto. Parasol-handles. Furnished by Harvey & Ford, Philadelphia, Pa.

3. Affording cameo and porcelain stock:

6968. Cameo-shell (*Cassis rufa*), used for cameo cutting. Florida. Dr. Wm. Stimpson.
——. Queen conch (*Strombus gigas*), exported to Liverpool in great numbers and ground up for making porcelain.[1] West Indies.

4. Used in Indian trade:

2705. Hyqua shell (*Dentalium indianorum*), used in Indian trade. In this case the shells have been made into a belt by the purchaser. West coast of America. U. S. Exploring Expedition.

5. Affording dyestuffs:

32907. Sea-hare (*Aplysia*). Affording purple dye. Florida. F. B. Meek.
32896. Sea-hare. Specimen of the purple fluid. F. B. Meek.
32911. Purple shells (*Phyllonotus radix*). Ornamental and producing dye. Lower California. W. H. Dall.
32912. Purple shells (*Phyllonotus bicolor*). Used for ornaments and affording dye. West coast of America. W. H. Dall.

6. Affording bird-lime:

33080. Giant slug (*Ariolimax columbianus*), affords a thick tenacious slime, which is used by the Indians to lime humming-birds. California to Alaska. H. Hemphill.

[1] The sea-ears and queen conchs are also largely used in Indian trade in a manufactured state.

B. Injurious:

1. By destroying food-producing mollusks or shell fish, such as clams, mussels, oysters, and razor-fish:

32860. Ribbon whelk (*Fulgur carica*). Florida. T. A. Conrad.
32859. Reversed whelk (*Fulgur perversa*). Carolinas. Dr. Wm. Stimpson.
32861. Hairy whelk (*Sycotypus canaliculatus*). Vineyard Sound. Dr. Wm. Stimpson.
32864. Winged conch (*Strombus alatus*). Tampa Bay, Florida. T. A. Conrad.
32863. Thorny drill (*Hemifusus bicoronatus*). Tampa Bay, Florida. T. A. Conrad.
32835. Drill (*Urosalpinx cinereus*). Florida to Massachusetts Bay. W. H. Dall.
32975. Drill. South Norwalk, Conn. Hoyt Bros.
32837. Periwinkle (*Purpura floridana*). Barataria Bay, La. Gustav Kohn.
32892. Sea-snail (*Lunatia Lewisii*). Monterey, Cal. H. Hemphill.
32913. Sea-snail (*Neverita recluziana*). California. W. H. Dall.
27620. Sea-snail (*Neverita duplicata*). North Carolina. T. D. Kurtz.
32866. Sea-snail (*Lunatia heros*). Massachusetts Bay. C. B. Fuller.

2. Injurious by destroying vegetable substances and garden plants:

33088. Slug (*Limax Hewstoni*). Oakland, Cal. H. Hemphill.

Mollusca acephala.—BIVALVE SHELLFISH.

A. Producing food or used as bait.

* *Oysters.*

1. Series illustrating distribution and geographical varieties:

Ostrea virginica, Gmelin.—EAST AMERICAN OYSTERS.

32784. Northern variety (*O. borealis*, Lam.) Prince Edward's Island. J. W. Dawson.
32813. Nova Scotia. J. H. Willis.
32785. Shediac, New Brunswick. W. H. Dall.
33092. "Pourrier Bed." Shediac, New Brunswick. G. F. Mathew.
33093. "Buctouche." Kent County, New Brunswick. G. F. Mathew.
32783. Miramichi River, New Brunswick. W. H. Dall.
32977. Indigenous oyster, now extinct. Shell-heaps. Damariscotta, Maine. Robert Dixon.
32978. Ditto. Shell-heaps. Sheepscot River, Maine. Robert Dixon.
32810. Indigenous oyster (var. *borealis*). Buzzard's Bay, Mass. Dr. Wm. Stimpson.
32814. Specimens showing color-bands. Rhode Island. General Totten.

NOTE.—The following series of oysters from the vicinity of New York were furnished by Mr. B. J. M. Carley, oyster-dealer, of Fulton Market, New York, through Mr. E. G. Blackford:

32790. "Greenwich." Greenwich, Conn.
32777. "Blue Point." Long Island, New York.
32779. "Lloyd's Harbor." Long Island, New York.

32781. "Cow Bay." Long Island, New York.
32791. "Glenwood." Glenwood, Long Island, New York.
32812. "Cove." Long Island, New York.
32920. "City Island." Long Island Sound, New York.
32919. "Mill Pond." Cow Bay, Long Island, New York.
32778. "Shrewsburys." Shrewsbury River, New Jersey.
32915. "Egg Island." Three years old. Morris Cove, Delaware.
33788. "Chesapeake." Crisfield, Md. E. G. Blackford.
32976. Pokamoke, Virginia. E. G. Blackford.

NOTE.—The following series from the waters of Virginia and Maryland, all indigenous or "natural growths" as distinguished from "plants," were selected by Mr. G. W. Harvey, and furnished by Harvey & Holden, oyster-dealers of Washington, D. C.:

33096. "St. Gerome River." Maryland.
33097. "Deep Creek." Eastern shore of Maryland.
33098. "Tangier Sound." Chesapeake Bay.
33100. "Little River." Western shore of Maryland.
33099. "Point Lookout Creek." Virginia.
33101. "Naswaddox." Eastern shore of Virginia.
33095. "Rappahannock." Rappahannock River, Virginia.
33103. "York River." York River, Virginia.
33104. "Cherrystones." Chesapeake Bay.
33102. "Presby's Creek." Presby's Creek, Virginia.

The following series from Florida were furnished by Kossuth Niles, U. S. N.:

32805. "Appalachicola Bay." Appalachicola Bay, Florida.
32806. "Cat Point." Same locality.
32807. ———. Same locality.
32808. "Raccoon oysters." Appalachicola Bay, Florida.

The following series from the vicinity of New Orleans were selected by M. Zatarain, and furnished by W. Alex. Gordon, esq., of New Orleans, La.:

32800. "Timbalier Bay." Louisiana.
32801. "Southwest Pass." Louisiana.
32802. "Bayou Cook." Louisiana.
32803. "Four Bayous." Louisiana.
32804. "Grand Lake." Louisiana.

Ostrea lurida, Cpr.—WEST COAST OYSTERS.

32879. Natives. Crescent City, Cal. W. H. Dall.
32809. Natives. Shoalwater Bay, W. T. H. Hemphill.
32798. Natives. San Diego, Cal. H. Hemphill.
32798. Eastern oyster (*O. virginica*). Taken from Newark Bay, N. J., when a year old and planted in San Francisco Bay; showing two years' growth in California waters.

Extra limital:

32878. Fossil oyster from marine Tertiary beds near Vicksburg, Miss. Closely resembling the present English oyster.
32311. Fresh specimen, English oyster (*O. edulis*, Linn.). Introduced for comparison with the American fossil and recent oysters. North Sea. Dr. Wm. Stimpson.

2. Series illustrating culture and individual variations:

Ostrea virginica, Gmelin.—EAST AMERICAN OYSTERS.

That portion of the series from South Norwalk, Conn., was furnished by Hoyt Bros. of that place, at the instance of James Richardson, esq. The portion of the series from the vicinity of New York was furnished by Mr. B. J. M. Carley through Mr. E. G. Blackford, of New York.

a. Growth. 1–20 years old:

32958. Young spat on various stools. South Norwalk, Conn.
32957. One year old. South Norwalk, Conn.
32967. Two to three years old. Natural growth. South Norwalk, Conn.
32968. Three to four years old. Natural growth. South Norwalk, Conn.
32965. "Cullers." Three to four years old. South Norwalk, Conn.
32962. Three years after transplantation. South Norwalk, Conn.
32964. "Box." Four to six years old. South Norwalk, Conn.
32916. "Cullers." Three years old. Vicinity of New York.
32918. "Single extra." Four years old. Vicinity of New York.
32776. "Double extra." Vicinity of New York.
32917. "Box." Three years old. Vicinity of New York.

b. Peculiarities of form and growth:

32959. "Pinched" oyster from muddy bottom. South Norwalk, Conn.
32930. Showing effect of transplanting the "pinched" from a muddy to a hard bottom. South Norwalk, Conn.
32787. Form caused by growing in a tideway. Vicinity of New York.
32786. Form caused by growing in still water. Vicinity of New York.
32974. Curious forms of shell. South Norwalk, Conn.
32782. Peculiar growth. Vicinity of New York.
32795. Specimens of peculiar form. Vicinity of New York.
32971. Natural growth on stone. South Norwalk, Conn.
32973. Natural growth on part of stone jug. South Norwalk, Conn.
32972. Natural growth on shells. South Norwalk, Conn.
32970. Natural growth on bottle. South Norwalk, Conn.
32969. Natural growth on crab. South Norwalk, Conn.
32780. Illustrating methods of attachment. Vicinity of New York.
32914. Blue Point "seed." Long Island, New York.
32789. Rosette of oysters. Vicinity of New York.
32792. Shell growing on *Mactra* shell. Vicinity of New York.
32794. "Seed" on old rubber boot. Vicinity of New York.
32793. "Seed" growing on stone. Vicinity of New York.
32895. "Seed" on rubber shoe. Vicinity of New York.
32894. "Seed" on bone. Vicinity of New York.
32797. "Seed" on bark. Vicinity of New York.
32796. "Seed" on leather shoe. Vicinity of New York.
32932. "Seed" on old boot-leg. Vicinity of New York.

c. Enemies and parasites:

32927. Specimens injured by whelk. South Norwalk, Conn.
32929. Specimens injured by hairy whelk. South Norwalk, Conn.

32928. Specimens perforated by "drill." South Norwalk, Conn.
32963*a*. Specimen injured by boring worm (an *Annelid*). South Norwalk, Conn.
32956. Specimens killed by star-fish. South Norwalk, Conn.
32963. Specimens showing ravages of *Cliona* or boring sponge. South Norwalk, Conn.
For commensal crab see Crustacea.
33092*a*. Lime derived from oyster shells. Use in medicine and as a fertilizer. Washington, D. C. W. H. Dall.

**** Other bivalves.*

A. Affording or available for food or bait.

32887. Rock oyster (*Placunanomia macroschisma*, Desh.). Alaska to California. W. H. Dall.
32873. Scallops (*Pecten irradians*, Lam.). Long Island Sound. Dr. Wm. Stimpson.
32868. Great scallop (*P. tenuicostatus*, Migh.). Coast of Maine. C B. Fuller.
27523. Black mussel (*Mytilus edulis*, L.). Massachusetts Bay. Dr. Wm. Stimpson.
32857. Ditto. San Francisco Bay, California. H. Hemphill.
32845. Ditto. Monterey, Cal. H. Hemphill.
32849. Ditto. San Diego, Cal. H. Hemphill.
32875. Grooved mussel (*Modiola plicatula*, Lam.). Nahant, Mass. Dr. Wm Stimpson.
32834. Ditto. (*Modiola*, sp.) Last Island, La. Gustav Kohn.
32858. Brown mussel (*M. capax*, Conr.). San Diego, Cal. H. Hemphill.
32876. Ditto. (*M. modiolus*, L.) Massachusetts Bay. Dr. Wm. Stimpson.
32897. Ditto. Massachusetts Bay. Dr. Wm. Stimpson.
——. Ditto. Castine, Me. A. R. Crittenden.
32871. Giant cockle (*Cardium magnum*, Birn.). Tampa Bay, Florida. T. A. Conrad.
32851. Egg cockle (*C. elatum*, Sby.). Guaymas, west coast Mexico. Dr. Palmer.
32853. Nuttall's cockle (*C. nuttallii*, Con.). Baulinas, Cal. H. Hemphill.
32891. Ditto. Alaska. W. H. Dall.
32872. "Red edge" (*Codakia tigerrina*, L.). Florida. Dr. Wm. Stimpson.
32877. Quahog—round clam (*V. mercenaria*, L.). Maine to Florida.
32862. Ditto. (Var. *mortoni*.) Maine to Florida. Dr. Stimpson.
32893. Ditto. Providence River, Rhode Island. Benj. Davis.
32819. Ditto. "Snubnosed" var. Fire Island. B. J. M. Carley.
32817. Ditto. Elongated var. Rockaway, N. J. B. J. M. Carley.
32838. Ditto. Barataria Bay, La. Gustav Kohn.
32818. Ditto. Deformed specimens. Long Island Sound. B. J. M. Carley.
——. Ditto. Specimens of shell polished. Jas. T. Ames.
32889. "Hen clam" (*Pachyderma crassatelloides*, Conr.). California. W. H. Dall.
32843. "Round clams" (*Saxidomus aratus*, Gld.). San Diego, Cal. H. Hemphill.
32867. "Painted clam" (*Callista gigantea*, Ch.). South Carolina.
32841. "Little Neck clams" (*Chione succincta*, Val.). San Diego, Cal. H. Hemphill.
32842. Ditto. (*C. simillima*, Sby.). San Diego, Cal. H. Hemphill.

32846. Ditto. (*Tapes laciniata*, Cpr.). San Diego, Cal. H. Hemphill.
32854. Ditto. (*T. staminea*, Conr.). Baulinas, Cal. H. Hemphill.
32844. Ditto. Tomales Bay, Cal. H. Hemphill.
32869. "Hen clam" (*Mactra solidissima*, Ch.). Massachusetts Bay. W. H. Dall.
32870. Ditto. Shells utilized for catch-alls. Newport, R. I. N. C. Peterson.
32888. Ditto. (*M. falcata*, Gld.). Alaska to California. W. H. Dall.
32826. "Gapers" (*Schizothærus nuttalli*, Con.). Oregon. J. G. Swan.
32852. Ditto. Baulinas, Cal. H. Hemphill.
32874. Salmon tellen (*Macoma*, sp.). Florida. T. A. Conrad.
32848. "Tellens" (*M. nasuta*, Conr.). San Francisco markets. H. Hemphill.
32847. "Flat clam" (*Semele decisa*, Cpr.). San Diego, Cal. H. Hemphill.
32909. "Razor-fish" (*Solen ensis*, L.). Cow Bay, New York. B. J. M. Carley.
32881. Ditto. (*Siliqua patula*, Dixon.) Alaska to California. W. H. Dall.
32955. "Soft-shelled clams" (*Mya arenaria*, L.). Cape Cod, Mass. E. G. Blackford.
32829. Ditto. Oyster Bay, L. I. E. G. Blackford.
32833. Ditto. Accidentally transplanted with young oysters to San Francisco Bay, where it now abounds greatly. Oakland, Cal. H. Hemphill.
33094. Ditto. Bay of Fundy, N. S. G. F. Mathew.
32850. Date-fish (*Platyodon cancellatus*, L.). Baulinas Bay, Cal. H. Hemphill.
32856. Ditto. (*Zirphæa crispata*, L.). Baulinas, Cal. H. Hemphill.

B. Useful or ornamental bivalves other than those affording food:

a. Pearl-producing.

1. River mussels:

26092*a*. River mussel affording pearl-shell, illustrating application of raw material. Cincinnati, Ohio. D. H. Shaffer.
26092. Carvings, from pearl-shell afforded by river mussels, for use as studs, buttons, pins, brooches, &c. Cincinnati, Ohio. D. H. Shaffer.
26092*b*. Pearls derived from river mussels. Cincinnati, Ohio. D. H. Shaffer.
——. A series of river mussels of various species, one valve polished, the other in its original condition in each case. Chicopee, Mass. Jas. T. Ames.
25986 to 26010. Another series, both valves polished, from Dr. C. A. Miller, Cincinnati, Ohio, comprising the following species:

Unio rugosus, Barnes.
alatus, Say.
ornatus, Lea.
verrucosus, Barnes.
gibbosus, Barnes.
rectus, Lam.
cylindricus, Say.
pyramidatus, Lea.
tuberculatus, Barnes.
siliquoides, Barnes.
circulus, Lea.
anodontoides, Lea.
pustulosus, Lea.
cuneatus, Barnes, &c., &c.

2. Marine pearl-shells:

13507. American pearl-oyster (*M. fimbriata*). Panama. Col. Jewett.
3624. Ditto. Illustrating formation of pearls. Panama. Col. Jewett.
32836. Ditto. Gulf of California. J. Xantus.
——. Ditto. Polished shell. Chicopee, Mass. Jas. T. Ames.
32921. Ditto. Made into artificial fish-bait. Boston, Mass. Bradford & Anthony.
32922. Ditto. Made into artificial minnow. Boston, Mass. Bradford & Anthony.
——. Series of buttons, studs, stopper-caps, &c. Manufactured from, and showing application of American pearl-oyster shell. Furnished by A. B. De Frece & Co., 428 Broadway, New York.

b. Otherwise useful:

32869. "Hen clam" (*Mactra solidissima*, Ch.). Shell used for scoops, milk-skimmers, and boat-bailers. Painted inside and used for catch-alls.
29527. Basket. Made from Florida shells. E. F. Gilbert, Jacksonville, Fla.
22210. Basket. Made from Florida shells. Mrs. C. E. Mott, Jacksonville, Fla.
22209. Frame. Made from Florida sea-shells. Mrs. C. E. Mott, Jacksonville, Fla.
22211. Easter Cross. Made from Florida shells. Mrs. C. E. Mott, Jacksonville, Fla.
29526. Shell flowers. Made from Florida shells. E. F. Gilbert, Jacksonville, Fla.
26595. "Coquina." Miscellaneous species broken up and cemented by surf action into a natural conglomerate, used for building stone or for making a superior kind of lime. Saint Augustine, Fla. G. Browne Goode.
32839. "Cuneate clam" (*Gnathodon cuneatus*). Used largely for bait. Natural condition. Lake Pontchartrain, La. Gustav Kohn.
32840. Ditto. Semi-fossil (in shell-heaps), used for macadamizing roads. Lake Salvador, La. Gustav Kohn.

C. Injurious bivalves:

a. Destroying submerged timber:

Specimens of wood showing ravages:

32982. Ship-worm (*Teredo* sp.). Bangor, Me. (Brig H. B. Emory.) C. H. Parker.
32908. Ditto. In lignumvitæ wood. Gloucester, Mass. Samuel Elwell, jr.
33106. Ditto. (*Teredo chlorotica*, Gld.) Wood's Holl, Mass. Vinal N. Edwards.
33105. Ditto. (*Xylotrya fimbriata*, Jeffr.) Wood's Holl, Mass. Vinal N. Edwards.
32984. Ditto. (*Teredo navalis?* L.) New Haven, Conn. A. E. Verrill.
32902. Ditto. (*Teredo* sp.) Showing damage effected in white-pine wood in one year. Pier 44, North River, N. Y. W. T. Pelton.
32901. Ditto. Showing damage to hard-pine wood effected in one year. Charleston, S. C. W. T. Pelton.
32983. Ditto. Schooner Carrie Melvin; done in 6 weeks. Charleston, S. C. A. G. Hunt.

32815. Ship-worm. (*Teredo* sp.). Gulf coast. Dewey.
32816. Ditto. Showing lining of tubes. Texas. Dr. Schott.
19405. Ditto. (*Xylotrya* sp.) Coast of Oregon. J. G. Swan.

D. Prepared foods:

* Specimens of various brands of canned, preserved, and pickled shell-fish in manufacturers' packages:

26579. Pickled oysters (*Ostrea virginica*). Blue Point. B. J. M. Carley.
26581. Pickled oysters (*Ostrea virginica*). Saddle Rocks. B. J. M. Carley, New York.
25835. Fresh Cove oysters (*Ostrea virginica*). Kemp, Day & Co., New York.
25844–54. Fresh Cove oysters (*Ostrea virginica*). Kemp, Day & Co., New York.
25861–3. Spiced Cove oysters (*Ostrea virginica*), hermetically sealed. Kemp, Day & Co., New York.
26577. Pickled Little Neck clams (*Mya arenaria*). B. J. M. Carley.
26582. Pickled clams (*Venus mercenaria*). "Cow Bay." B. J. M. Carley.
26642. The Farmers' Old Orchard Beach clams (Little Necks, star brand). Portland Packing Company, Portland, Me.
26575. Pickled scallops (*Pecten irradians*). Oyster Bay. B. J. M. Carley.
26580. Pickled mussels (*Mytilus edulis*). East River, N. Y. B. J. M. Carley, New York.
25873. Scarboro' Beach clams (*Venus mercenaria*). Put up by Burnham & Morrill, Portland, Me. Kemp, Day & Co., New York.
25864–6. Orchard Beach clams (*Venus mercenaria*). Kemp, Day & Co., New York.
25867–9. Little Neck clams (*Mya arenaria*). Kemp, Day & Co., New York.
25870–2. Little Neck clams (*Mya arenaria*). Put up by Bogart & Co., New York. Kemp, Day & Co., New York.
24925. Little Neck clams (*Mya arenaria*). Wm. Underwood & Co., Boston, Mass.
22235–6. Pickled Little Neck clams (*Mya arenaria*). Penobscot Bay. Castine Packing Company, Castine, Me.
26752. Alden's granulated clams. Prepared by Alden Sea-Food Company. Sold by Lyon Manufacturing Company, New York. Presented by E. G. Blackford, New York.
26753. Alden's granulated and concentrated clams (paper boxes). Prepared by Alden Sea-Food Company. Sold by Lyon Manufacturing Company, N. Y. Presented by E. G. Blackford, New York.

** Otherwise prepared.

5672. Dried siphons of *Schizothærus Nuttalli*. Prepared by the Puget Sound Indians, Wash. Ter. Dr. J. G. Suckley, U. S. Army.

CRUSTACEA.

Crustacea phyllopoda.

A. Useful; converted into fertilizers; carapax used as a scoop or boat-bailer:

2222. King crab, Horseshoe (*Limulus polyphemus*). Florida. F. B. Meek.
2223. Ditto. Male and female. Cape May C. H., New Jersey. Thos. Beesley.
2223. Ditto. Product "cancrine," prepared fertilizer. Cape May C. H., New Jersey. Thos. Beesley.

Crustacea isopoda.

A. Useful; by removing wrecks or snags.

B. Injurious; by destroying submerged timber.

2286. Woodeater (*Limnoria lignorum*, White). San Diego, Cal. H. Hemphill.

2254. Ditto. New Haven, Conn. A. E. Verrill.

a. Wood showing ravages:

2240. Eastport, Me. U. S. Fish Commission.

2290. Wood's Holl, Mass. Vinal N. Edwards.

2221. San Diego, Cal. H. Hemphill.

Crustacea stomatopoda.

Available for food:

2253. Squill (*Squilla empusa*, Say). Long Island Sound. U. S. Fish Commission.

2268. Southern squill (*Coronis glabriuscula*, Stm.). Galveston, Texas. M. Wallace.

Crustacea decapoda.—LOBSTERS, SHRIMP, CRAWFISH, CRABS.

A. Useful; food-supplying:

2263. River shrimp (*Palæmon* sp.). New Orleans, La. Gustav Kohn.

2264. Ditto. (*Pal. ohionis*, Smith.) New Orleans, La. Gustav Kohn.

2269. Ditto. (*Palæmon?*) Isthmus of Panama. Dr. Bransford.

2252. Sea shrimp (*Palæmonetes vulgaris*, Stm.). Long Island Sound. U. S. Fish Commission.

2211. Shrimp (*Pandalus Danæ*, Stm.), as dried for export by Californian Chinese. San Francisco, Cal. H. Hemphill.

2220. Ditto. (*Hippolyte brevirostris*, Dana.) San Francisco, Cal. H. Hemphill.

2219. Ditto. (*Crangon franciscorum*, Stm.) San Francisco, Cal. H. Hemphill.

2251 Ditto. (*Crangon vulgaris*, Fbr.) New England coast. U. S. Fish Commission.

2267. River crawfish (*Astacus oregonensis*, Nutt.). California. J. R. Scupham.

2261. Ditto. (*Cambarus Clarkii*, Gir.) New Orleans, La. Gustav Kohn.

2265. Ecrevisse (*Cambarus affinis*, Er.). Potomac River, Va. J. W. Milner.

2280. Lobster (*Homarus americanus*, Edw.). New York. E. G. Blackford.

2250. Ditto. Series showing young stages. Vineyard Sound, Mass. U. S. Fish Commission.

2241. Ditto. Young specimens, dry. Massachusetts Bay. U. S. Fish Commission.

2212. Ditto. Claws of extraordinary size. Massachusetts Bay. Amos Lawrence.

2213. Ditto. Remarkably abnormal claws. Newport, R. I. J. H. Clarke.

2214. Ditto. Noank, Conn. T. & E. H. Potter.

——. Pincushion, showing application of lobster-claws. Wellfleet, Mass. Miss Anabel Stone.

2215. Prawn; Sea crawfish (*Panulirus interruptus*, Ran.). Santa Barbara Channel, Cal. H. Hemphill.

2248. Crab (*Platyonichus ocellatus*, Latr.). Vineyard Sound, Mass. U. S. Fish Commission.
2256. Ditto. (*Panopeus Herbstii*, Edw.) New Orleans, La. Gustav Kohn.
2247. Ditto. (*Carcinus mœnas*, Leach.) New Haven, Conn. A. E. Verrill.
2243. "Soft-shelled" (in certain stages only) crab (*Callinectes hastatus*, Say). Vineyard Sound, Mass. U. S. Fish Commission.
2249. Ditto. Long Island Sound. U. S. Fish Commission.
2218. Kelp-crab (*Episthus productus*, Randall). Monterey, Cal. H. Hemphill.
2244. Crab (*Cancer borealis*, St.). Casco Bay, Maine. U. S. Fish Commission.
2242. Common crab (*Cancer irroratus*, Say). Casco Bay, Maine. U. S. Fish Commission.
2245. Ditto. Vineyard Sound, Mass. U. S. Fish Commission.
2217. Scalloped crab (*Cancer antennarius*, Stm.). San Francisco, Cal. H. Hemphill.
2216. Market crab (*Cancer magister*, Dana). San Francisco, Cal. H. Hemphill.

B. Commensal with other food supplies:

2266. Oyster-crab (*Pinnotheres ostreum*, Say). Commensal with all southern oysters and with northern-oysters in northern rivers where the southern oysters have been long planted. New York. E. G. Blackford.
2272. Ditto. Commensal on the western coast with *Pachydesma* and *Mytilus californianus*. San Diego, Cal. H. Hemphill.

C. Injurious by burrowing into and weakening levees and dams:

2261. Crawfish (*Cambarus Clarkii*, Gir. and most other species). New Orleans, La. Gustav Kohn.
2259. Fiddler-crab (*Gelasimus pugnax*, Smith). New Orleans, La. Gustav Kohn.

D. Prepared foods:

Canned lobster and crabs in manufacturers' packages:

25836–43. Canned lobster (*Homarus americanus*). Kemp, Day & Co., New York.
22237. Canned lobster (*Homarus americanus*). Castine, Me. Castine Packing Company.
26643. Fresh star-lobster (star brand). Portland Packing Company, Portland, Me.
26651. Fresh star-lobster (star brand). Portland Packing Company, Portland, Me.
24926. Fresh lobster (*Homarus americanus*). Wm. Underwood & Co., Boston, Mass.
25834. Canned lobster (*Homarus americanus*). Kemp, Day & Co., New York.
24933. Original deviled lobster (*Homarus americanus*). Wm. Underwood & Co., Boston, Mass.
26578. Pickled lobsters (*Homarus americanus*). Cape Cod. B. J. M. Carley, New York.
26576. Pickled prawns. Savannah, Ga. B. J. M. Carley.

Cirripedia.

Injurious:

a. By dulling the edge of knives and spades employed in "cutting in" whale blubber:

2270. Whale barnacle (*Coronula diadema*, Lam.) on dried skin of "humpback" whale. New England coast. U. S. Fish Commission.

b. By obstructing the progression of vessels upon which they affix themselves:

2271. Barnacles (*Balanus rugatus*, &c.). California. H. Hemphill.

ANNULOSA.

Annelida.—WORMS AND LEECHES.

A. Useful:

1. In surgery and medicine:

3226. Leech (*Macrobdella decora*, Verrill). New Haven, Conn. A. E. Verrill.

3227. Ditto. (*Macrobdella* sp.) Mountain Lake, Cal. H. Hemphill.

2. For bait in fishing:

3228. Earthworm (*Lumbricus terrestris*, L.). Washington, D. C. W. Palmer.

3229. Sea-worm (*Nereis* sp.?). San Francisco, Cal. H. Hemphill.

3. For food:

19713. Dried worms (*Ephydra* sp.). Prepared for food by the Monachee Pi-Ute Indians. Owen's Lake, Cal. Stephen Powers.

19714. Dried worms. Used in making soup by the Monachee Pi-Ute Indians. Owen's Lake, Cal. Stephen Powers.

B. Injurious:

1. By boring into and destroying oyster-shells:

32963*a*. Oyster-shell, showing ravages (of *Heteronereis?*). South Norwalk, Conn. Hoyt Brothers.

NOTE.—Insects and larvæ, commonly called worms, affecting chiefly agricultural interests, are not here included.

RADIATA.

Radiates.—SEA-URCHINS, STARFISH, CORALS, MEDUSÆ, ETC.

N. B. Strictly ornamental corals and gorgonias, having no special useful application, have, for the same reasons which necessitated the exclusion of the solely ornamental shells, been here omitted.

A. Useful:

1. Food-producing:

3226. Trepang; Bêche-de-mer (*Holothuria* sp.?). San Diego, Cal. H. Hemphill.

3212. Sea-urchin (*Strongylocentrotus dræbachiensis*). New England coast. U. S. Fish Commission.
3146. Ditto. (*Toxopneustes* sp.) Southern United States. Dr. William Stimpson.
3145. Ditto. (*T. franciscorum*, Ag.) Alaska to California. F. Bischoff.

B. Injurious:

1. Destroying oysters, clams, &c.:

3214. Starfish (*Asterias vulgaris*, Stm.). Portland, Me. U. S. Fish Commission.
3149. Ditto. (*Ast. arenicola*, Stm.) Massachusetts Bay. Dr. William Stimpson.
3213. Ditto. Long Island Sound. U. S. Fish Commission.
3150. Ditto. South Norwalk, Conn. Hoyt Brothers.
3151. Ditto. In act of destroying oysters. South Norwalk, Conn. Hoyt Brothers.

2. By their urticating powers annoying bathers and "fouling" nets and fishing lines with slime—various *Acalephs*.

PROTOZOA.

Protozoans.—SPONGES, ETC.

Useful:

1. For conveyance of fluids requiring an elastic and temporary menstruum, and as a detergent:

3210. Sponge (on bougie). Boston, Mass. J. A. Levey.
3206–9. Sponge (*Spongia barbara*, D. & M.). Florida Keys and Bahamas. Isaacs & Co., sponge-dealers, New York.

3205. Ditto. (*Spongia graminea*, Hyatt). (Prepared by cleansing for use.) Key West. Boston Soc. Nat. Hist.
3203–4. Ditto. (Dried in natural condition.) Key West. Boston Soc. Nat. Hist.
3152–3. 3167. } Ditto. (*S. dura*, var. *densa*, Hyatt.) Florida Keys. Isaacs & Co.
3154–66. Ditto. (*S. dura*, var. *gravida*, Hyatt.) Florida Keys. Isaacs & Co.
3172. Ditto. Dried in natural state. (*Aplysina aurea*, Hyatt.) Bahamas. Boston Soc. Nat. Hist.
3168–71. Ditto. (Cleansed.) (*S. dura*, var. *punctata*, Hyatt.) Florida Keys. Isaacs & Co.
3177. Ditto. (Dried in natural state.) (*S. cerebriformis*, Hyatt.) Key West. Boston Soc. Nat. Hist.
3173–76. Ditto. (Cleansed.) Key West and Bahamas. Isaacs & Co.
3178–9. Ditto. (*S. tubulifera*, Lam.). Florida and Bahamas. Isaacs & Co.
3180–85. Ditto. (*S. tubulifera*, var. *rotunda*, Hyatt.) Florida Keys and Bahamas. Isaacs & Co.
3186. Ditto. (Dried in natural condition.) Florida Keys. Boston Soc. Nat. Hist.

3189–90. Ditto. (Cleansed.) (*S. tubulifera*, var. *disciformis*, Hyatt.) Florida Keys and Bahamas. Isaacs & Co.

3192–96. Ditto. (*S. gossypina*, D. & M., var. *hirsuta*.) Florida Keys and Bahamas. Isaacs & Co.

3197. Ditto. (*S. gossypina*, var. *dendritica*.) Florida Keys and Bahamas. Isaacs & Co.

3198–3202. Ditto. (*S. gossypina*, var. *porosa*.) Florida Keys and Bahamas. Isaacs & Co.

2. Useful as an elastic medium or absorbent:

3213*a*. Sponge prepared for use as lint in surgery. Wm. B. Moses, Washington, D. C.

3211. Ditto. For stuffing cushions and packing. Florida. Jas. Richardson.

3212*a*. Ditto. Prepared for stuffing cushions, mattresses, &c. Florida. Wm. B. Moses, Washington, D. C.

Injurious:

1. By destroying oysters:

3215. Boring sponge (*Cliona sulphurea*, Verrill). Mature form, after oyster-shell has disintegrated. Vineyard Sound, Mass. U. S. Fish Commission.

32979. Boring sponge. Shells of Pecten showing ravages. Castine, Me. A. R. Crittenden.

32980. Ditto. Castine, Me. L. J. Heath.

32820. Ditto. Showing effect on oyster-shell. New York Bay. B. J. M. Carley.

3147. Ditto. Showing various stages in shell. Shrewsbury River, N. J. B. J. M. Carley.

Rhizopods.

Useful; the fossil forms being largely employed as a polishing powder under the name of "Tripoli" or "infusorial earth"; as a menstruum for nitro-glycerine, in the manufacture of dynamite and other explosives; and also in the manufacture of "stone china" and pottery. The valuable quality in nearly all cases is the contained silica.

MISCELLANEOUS PRODUCTS OF SEA OR SHORE, NOT OF AN ANIMAL NATURE.

Plants:

a. Lichens:

29316. Orchilla (*Roccella tinctoria*), in its natural condition as gathered from rocks and branches of plants. West coast of North America. W. A. Ross & Bro., New York.

29313. "Archil liquor," derived from Orchilla, and extensively used as a dye-stuff. West coast of North America. W. A. Ross & Bro., New York.

29314. "Cudbear." Product of a lichen (*Lecanora*), extensively applied as a dye-stuff. Western coast of North America. W. A. Ross & Bro., New York.

b. Algæ:

1. Having economical applications:

**Available as food.*

——. Irish moss (*Chondrus crispus*, L.), affording gelatine. New England coast. Dr. W. G. Farlow.

——. Western dulse (*Schizymenia edulis*, Ag.). West coast United States. Rev. E. Hall.

——. Dulse (*Rhodymenia palmata*, Grev.), used for food. New England coast. Dr. W. G. Farlow.

——. Laver (*Porphyra vulgaris*, Ag.), used for food. New England coast. Dr. W. G. Farlow.

——. Badderlocks (*Alaria esculenta*, Grev.). Available for food. Cape Cod northward.

***Employed in the manufacture of fertilizers, iodine and bromine, or "artificial staghorn" (Laminaria) articles.*

——. Rockweed (*Fucus vesiculosus*, L. & C.). New England coast. Dr. W. G. Farlow.

——. Bull-head kelp (*Nereocystis Lütkeana*, P. & M.). Stems made by Indians into fishing-lines. Northwest coast of America. W. H. Dall.

——. Specimens of lines made of this material. [See ethnological and fishing-implement series.]

29373. Devil's apron (*Laminaria digitata*), dried stems for making "tents." Newfoundland. Dr. E. R. Squibb.

29373*a*. "Sponge tents" used in surgery, made from dried *Laminaria* stems.

29373*b*. Paper-knife, made of "artificial staghorn" or dried *Laminaria* (*longicruris*), by J. H. Batchelder, Cambridge, Mass.

2. Ornamental algæ:

The following series, prepared by Dr. W. G. Farlow, comprises specimens collected by Mr. F. W. Hooper and Dr. Palmer, at Key West; by Dr. Farlow on the New England coast; by Prof. D. C. Eaton from various sources; by A. R. Young, at New York; Mrs. A. S. Davis, at Cape Ann; Mrs. Beebe, at Gloucester, Mass.; Mrs. B. D. Halstead, at Swampscott; Mr. H. Averill, at New York; Dr. L. R. Gibbes, in South Carolina; Miss M. A. Booth, at Orient, L. I.; and from California and Oregon by Dr. C. L. Anderson, Capt. I. Stratton, Rev. E. Hall, Mr. H. Hemphill, D. Cleveland, and Mr. W. H. Dall:

AMANSIA MULTIFIDA, Lmx. Key West.
DASYA GIBBESII, Harv. Key West.
DASYA ELEGANS, Ag. *Chenille.* Cape Cod.
DASYA RAMOSISSIMA, Harv. Key West.
DASYA HARVEYI, Ashmead. Key West.
DASYA MOLLIS, Harv. Key West.
DASYA MUCRONATA, Harv. Key West.
DASYA WURDEMANNI, Bailey. Key West.
DASYA CALLITHAMNION, Harv. San Diego.

DASYA TUMANOWICZI, Gatty. Key West.
DASYA LOPHOCLADOS, Mont. Key West.
DASYA PLUMOSA, Bail. and Harv. Santa Cruz, Cal.
BOSTRYCHIA MONTAGNEI, Harv. Key West.
BOSTRYCHIA CALAMISTRATA, Mont. Key West.
BOSTRYCHIA MORITZIANA, Mont. Florida.
POLYSIPHONIA URCEOLATA, Grev. Nahant, Mass. Var. *formosa*, New England.
POLYSIPHONIA HAVANENSIS, Mont. Var. *Binneyi*, Ag., Key West.
POLYSIPHONIA FERULACEA, Ag. Key West.
POLYSIPHONIA OLNEYI, Harv. *Dough-balls.* Long Island Sound.
POLYSIPHONIA HARVEYI, Bail. *Nigger-hair.* Wood's Holl, Mass.
POLYSIPHONIA ELONGATA, Grev. *Lobster-claws.* Gay Head, Mass.
POLYSIPHONIA VIOLACEA, Grev. Wood's Holl, Mass.
POLYSIPHONIA FIBRILLOSA, Grev. Wood's Holl, Mass.
POLYSIPHONIA VARIEGATA, Ag. Wood's Holl, Mass.
POLYSIPHONIA PENNATA, Ag. California.
POLYSIPHONIA PARASITICA, Grev. California. Var. *dendroidea*, Ag., California.
POLYSIPHONIA BAILEYI, Ag. Pacific coast.
POLYSIPHONIA PECTEN-VENERIS, Harv. Florida.
POLYSIPHONIA ATRORUBESCENS, Grev. Wood's Holl, Mass.
POLYSIPHONIA BIPINNATA, Post. and Rupr. West coast.
POLYSIPHONIA WOODII, Harv. West coast.
POLYSIPHONIA NIGRESCENS, Grev.
POLYSIPHONIA FASTIGIATA, Grev. Nahant, Mass.
ODONTHALIA ALEUTICA, Ag. Oregon.
ODONTHALIA LYALLII, Harv. Neeah Bay, W. T.
RHODOMELA LARIX, Ag. California.
RHODOMELA FLOCCOSA, Ag. Aleutian Islands.
RHODOMELA SUBFUSCA, Ag. Gloucester, Mass. Var. *gracilis*, same limits. Var. *Rochei*, Long Island Sound.
DIGENIA SIMPLEX, Ag. Key West.
BRYOTHAMNION TRIANGULARE, Ag. Key West.
BRYOTHAMNION SEAFORTHII, Ag. Florida.
ALSIDIUM BLODGETTII, Harv. Key West, Fla.
ACANTHOPHORA THIERII, Lmx. Florida to Brazil; Pacific Ocean.
ACANTHOPHORA MUSCOIDES, Ag. Florida.
CHONDRIA DASYPHYLLA, Ag. Cape Cod.
CHONDRIA STRIOLATA, Ag. (*C. Baileyana*, Mont.) Cape Cod.
CHONDRIA TENUISSIMA, Ag. Wood's Holl, Mass.
CHONDRIA LITTORALIS, Harv. Wood's Holl, Mass.
CHONDRIA ATROPURPUREA, Harv. Key West, Fla.
LAURENCIA PINNATIFIDA, Lmx. *Pepper-dulse.* California.
LAURENCIA VIRGATA, Ag. California.
LAURENCIA OBTUSA, Lmx. Florida.
LAURENCIA IMPLICATA, Ag. Key West.
LAURENCIA CERVICORNIS, Harv. Key West; San Diego, Cal.
LAURENCIA GEMMIFERA, Harv. Florida.
LAURENCIA PAPILLOSA, Grev. Florida.
LAURENCIA PANICULATA, Ag. San Diego, Cal.
CHYLOCLADIA OVALIS, Hook. (*Lomentaria*, Endl.) California.
GRINNELLIA AMERICANA, Harv. Wood's Holl, Mass.
DELESSERIA SINUOSA, Lmx. Gloucester, Mass.
DELESSERIA QUERCIFOLIA, Bory. California.

DELESSERIA ALATA, Lmx. Gloucester, Mass.
DELESSERIA HYPOGLOSSUM, Larmx. Chleston, S. C.
DELESSERIA TENUIFOLIA, Harv. Key West.
DELESSERIA INVOLVENS, Harv. Key West.
DELESSERIA LEPRIEURII, Mont. New York.
DELESSERIA DECIPIENS, Ag. West coast. Neeah Bay, W. T.
NITOPHYLLUM PUNCTATUM, var. *ocellatum*, Grev. Key West.
NITOPHYLLUM SPECTABILE, Eaton, mss. California.
NITOPHYLLUM LACERATUM, Grev. California.
NITOPHYLLUM LATISSIMUM, Ag. California.
NITOPHYLLUM AREOLATUM, Eaton, mss. California.
NITOPHYLLUM (NEUROGLOSSUM) ANDERSONII, Ag. California.
NITOPHYLLUM RUPRECHTIANUM, Ag. West coast.
CALLIBLEPHARIS CILIATA, Kütz. Cape Ann, Mass.
GRACILARIA MULTIPARTITA, Ag. Var. *angustissima*, Harv. New York.
GRACILARIA CERVICORNIS, Ag. Key West.
GRACILARIA CONFERVOIDES, Grev. Florida; California.
GRACILARIA ARMATA, Ag. Key West.
CORALLINA OFFICINALIS, L. Cape Ann.
CORALLINA SQUAMATA, Ellis and Sol. San Diego, California.
JANIA RUBENS, Lmx. San Diego, California.
JANIA CAPILLACEA, Harv. Key West.
AMPHIROA FRAGILLISSIMA, Lmx. Florida.
AMPHIROA NODULOSA, Kütz. Florida.
AMPHIROA DEBILIS, Kütz. Florida.
AMPHIROA CALIFORNICA, Decaisne. West coast.
MELOBESIA FARINOSA, Lmx. East coast.
MELOBESIA PUSTULATA, Lmx. Wood's Holl, Mass.
LITHOTHAMNION POLYMORPHUM, Aresch. Eastport, Me.
HILDENBRANDTIA ROSEA, Kütz. Eastport, Me.
GELIDIUM CORNEUM, Lmx. Florida; New Haven, Conn.
GELIDIUM CARTILAGINEUM, Grev. San Diego, Cal.
GELIDIUM COULTERI, Harv. California.
WURDEMANNIA SETACEA, Harv. Key West.
EUCHEUMA ISIFORME, Ag. Key West.
EUCHEUMA? ACANTHOCLADUM, Ag. (*Chrysymenia*, Harv.). Key West.
HYPNEA MUSCIFORMIS, Lmx. Wood's Holl, Mass.
HYPNEA CORNUTA, Ag. Key West.
RHODYMENIA PALMATA, Grev. *Common dulse.* Swampscott, Mass.
RHODYMENIA PALMETTA, Grev. California.
RHODYMENIA CORALLINA, Grev. California.
EUTHORA CRISTATA, Ag. Gloucester, Mass.
PLOCAMIUM COCCINEUM, Lyngb. Var. *flexuosum*. West coast.
STENOGRAMMA INTERRUPTA, Mont. California.
PIKEA CALIFORNICA, Harv. California.
CHAMPIA PARVULA, Harv. Noank, Conn.
LOMENTARIA BAILEYANA, Farlow (*Chylocladia*, Harv.). New York Bay.
LOMENTARIA ROSEA, Thuret. Gay Head, Mass.
RHABDONIA TENERA, Ag. (*Solieria chordalis*, Harv.) Wood's Holl, Mass.
RHABDONIA COULTERI, Harv. California.
CORDYLOCLADIA CONFERTA, Ag. San Diego, Cal.
POLYIDES ROTUNDUS, Ag. Cape Ann, Mass.
PEYSSONNELIA ATRO-PURPUREA, Crouan?. Key West.
NEMALION MULTIFIDUM, Ag. Watch Hill, R. I.
SCINAIA FURCELLATA, Bivon. Gay Head, Mass.

LIAGORA VALIDA, Harv. Florida.
LIAGORA PINNATA, Harv. Florida.
LIAGORA PULVERULENTA, Ag. Key West.
WRANGELIA PENICILLATA, Ag. Key West.
PHYLLOPHORA BRODIÆI, Ag. Long Island Sound.
PHYLLOPHORA MEMBRANIFOLIA, Ag. Long Island Sound.
GYMNOGONGRUS NORVEGICUS, Ag. (inc. *G. Torreyi*, Ag.). Peak's Island, Me.
GYMNOGONGRUS TENUIS, Ag. California.
GYMNOGONGRUS GRIFFITHSIÆ, Ag. California.
GYMNOGONGRUS LINEARIS, Ag. California.
AHNFELTIA GIGARTINOIDES, Ag. West coast.
AHNFELTIA PLICATA, Fr. Cape Ann, Mass.
CYSTOCLONIUM PURPURASCENS, Kütz. Block Island, New York.
CALLOPHYLLIS VARIEGATA, Ag. California.
CALLOPHYLLIS OBTUSIFOLIA, Ag. San Diego, Cal.
CALLOPHYLLIS DISCIGERA, Ag. California.
GIGARTINA ACICULARIS, Lmx. Florida.
GIGARTINA CANALICULATA, Harv. West coast.
GIGARTINA MAMILLOSA, Ag. Portland, Me.; Santa Cruz, Cal.
GIGARTINA MICROPHYLLA, Harv., and var. *horrida*. California.
GIGARTINA RADULA, Ag. West coast.
CHONDRUS CRISPUS, Lyngb. *Irish moss*. Cape Ann, Mass. Very common.
CHONDRUS AFFINIS, Harv. California.
IRIDÆA LAMINARIOIDES, Bory. (including *Iridæa minor* and *Iridæa dichotoma*). West coast.
ENDOCLADIA MURICATA, Ag. West coast.
CRYPTONEMIA CRENULATA, Ag. Key West.
CHRYSYMENIA HALYMENIOIDES, Harv. Key West.
CHRYSYMENIA UVARIA, Ag. Key West.
HALYMENIA LIGULATA, Ag. Var. *Californica*; Santa Cruz, Cal.
HALYMENIA FLORESIA, Ag. Key West.
PRIONITIS LANCEOLATA, Harv. West coast.
PRIONITIS ANDERSONII, Eaton, mss. Santa Cruz, Cal.
SCHIZYMENIA EDULIS, Ag. Oregon.
SCHIZYMENIA? COCCINEA, Harv. Santa Cruz, Cal.
GRATELOUPIA GIBBESII, Harv. Charleston, S. C.
GRATELOUPIA CUTLERIÆ, Kütz. California.
GRATELOUPIA FILICINA, Ag. Florida.
HALOSACCION HYDROPHORA, Ag. West coast.
HALOSACCION FUCICOLA, Post. and Rupr. West coast.
HALOSACCION RAMENTACEUM, Ag. Eastport, Me.
SPYRIDIA ACULEATA, Kütz. Florida.
SPYRIDIA FILAMENTOSA, Harv. Wood's Holl, Mass.
MICROCLADIA COULTERI, Harv. West coast.
MICROCLADIA CALIFORNICA, Farlow. California.
MICROCLADIA BOREALIS, Rupr. West coast.
CENTROCERAS CLAVULATUM, Ag. Key West.
CENTROCERAS EATONIANUM, Farlow. West coast.
CERAMIUM NITENS, Ag. Key West.
CERAMIUM RUBRUM, Ag. East coast.
CERAMIUM DESLONGCHAMPSII, Ch. Eastport, Me.
CERAMIUM DIAPHANUM, Roth. California.
CERAMIUM STRICTUM, Harv. New England.
CERAMIUM YOUNGII, Farlow, mss. Canarsie, L. I.
CERAMIUM TENUISSIMUM, Lyngb. Key West.

CERAMIUM FASTIGIATUM, Harv. Southern New England.
CERAMIUM ———. Key West.
PTILOTA DENSA, Ag. California.
PTILOTA HYPNOIDES, Harv. California.
PTILOTA PLUMOSA, Ag. Var. *filicina*, west coast. Var. *serrata*. Eastport, Me., and Neeah Bay, W. T.
PTILOTA ELEGANS, Bonnem. New York.
GLOIOSIPHONIA CAPILLARIS, Carm. Cape Ann, Mass.
CROUANIA ATTENUATA, J. Ag. Key West.
GRIFFITHSIA BORNETTIANA, Farl. Wood's Holl, Mass.
CALLITHAMNION TETRAGONUM, Ag. Orient, L. I.
CALLITHAMNION BAILEYI, Harv. New York.
CALLITHAMNION PTILOPHORA, Eaton, mss. California.
CALLITHAMNION BORRERI, Ag. New Haven, Conn.
CALLITHAMNION BYSSOIDEUM, Arn. Long Island Sound.
CALLITHAMNION CORYMBOSUM, Ag. Beverly, Mass.
CALLITHAMNION VERSICOLOR, Ag., var. *seirospermum*, Harv. New York.
CALLITHAMNION PLUMULA, Lyngb. Gay Head, Mass.
CALLITHAMNION HETEROMORPHUM, Ag., mss. California.
CALLITHAMNION AMERICANUM, Harv. New York.
CALLITHAMNION PYLAISÆI, Mont. Gloucester, Mass.
CALLITHAMNION FLOCCOSUM, Ag. Var. *pacificum*, Harv. Neeah, Bay, W. T.
CALLITHAMNION CRUCIATUM, Ag. New York.
CALLITHAMNION LEJOLISIA, Farlow, mss. San Diego, Cal.
CALLITHAMNION TURNERI, Ag. New York.
CALLITHAMNION ROTHII, Lyngb. New England coast.
CALLITHAMNION ROSEUM, Lyng. New York.
PORPHYRA VULGARIS, Ag. *Laver*. East coast.
BANGIA FUSCOPURPUREA, Lyngb. East coast.
CHANTRANSIA EFFLORESCENS, Thur. Gay Head, Mass.
CHANTRANSIA VIRGATULA, Thuret. Portland, Me.
ERYTHROTRICHIA CERAMICOLA, Aresch. Cape Ann, Mass.
PADINA PAVONIA, Lmx. *Peacock's-tail*. Key West, Fla.
ZONARIA LOBATA, Ag. Key West.
ZONARIA FLAVA, Ag. San Diego, Cal.
TAONIA SCHRŒDERI, Ag. Florida.
DICTYOTA FASCIOLA, Lmx. Florida; Mediterranean Sea.
DICTYOTA DICHOTOMA, D. C. Charleston.
DICTYOTA CILIATA, Ag. Key West.
DICTYOTA KUNTHII, Ag. San Diego, Cal.
DICTYOTA ACUTILOBA, Ag. Key West.
SARGASSUM VULGARE, Ag. Atlantic Ocean.
SARGASSUM BACCIFERUM, Ag. *Gulf-weed*. Gulf Stream.
SARGASSUM DENTIFOLLIUM, Ag. Key West.
SARGASSUM AGARDIANUM, Farlow, mss. San Diego, Cal.
TURBINARIA VULGARIS, Ag. Key West.
FUCUS FASTIGIATUS, Ag. West coast.
FUCUS DISTICHUS, *L.* (*F. filiformis*, Gm.). Swampscott, Mass.
FUCUS FURCATUS, Ag. Marblehead, Mass.
FUCUS VESICULOSUS, L. *Rock-weed*. Swampscott, Mass.
FUCUS SERRATUS, L. Nova Scotia.
NEREOCYSTIS LÜTKEANA, Post. and Rupr. *Great bladder-weed*. Monterey, Cal., and northward.
ALARIA ESCULENTA, Grev. *Badderlocks. Henware*. Cape Cod.

LAMINARIA SACCHARHINA, Lmx. *Devil's apron; Kelp.* New York, northward; west coast; Europe; Japan?.
LAMINARIA LONGICRURIS, De la Pyl. *Devil's apron; Kelp.* New England.
LAMINARIA FLEXICAULIS, Le Jolis. *Devil's apron; Kelp.* New England.
AGARUM TURNERI, Post. and Rupr. *Sea-colander.* Nahant, Mass.
STILOPHORA RHIZODES, Ag. Vineyard Sound.
ASPEROCOCCUS SINUOSUS, Bory. Key West.
ASPEROCOCCUS ECHINATUS, Grev. New England coast.
HYDROCLATHRUS CANCELLATUS, Bory. Noank, Conn.
RALFSIA VERRUCOSA, Aresch. Nahant, Mass.
CHORDA FILUM, Stack. New York.
CHORDARIA FLAGELLIFORMIS, Ag. Eastport, Me.
CHORDARIA ABIETINA, Rupr. Santa Cruz, Cal.
CHORDARIA DIVARICATA, Ag. Gloucester, Mass.
CASTAGNEA VIRESCENS, Thuret. Wood's Holl, Mass.
LEATHESIA TUBERIFORMIS, Gray. Watch Hill, R. I.
ELACHISTA FUCICOLA, Fr. New England.
MYRIONEMA STRANGULANS, Grev. Wood's Holl, Mass.
MYRIONEMA LECLANCHERII, Harv. Gloucester, Mass.
CLADOSTEPHUS SPONGIOSUS, Ag. Newport, R. I.
CLADOSTEPHUS VERTICILLATUS, Ag. Gay Head, Mass.
SPHACELARIA FUSCA, Ag. On *Amphiroa Californica*, San Diego, Cal.
SPHACELARIA RADICANS, Ag. New England.
ECTOCARPUS FIRMUS, Ag. (*E. littoralis*, Harv.). New England.
ECTOCARPUS FARLOWII, Thuret. Peak's Island, Me.
ECTOCARPUS SILICULOSUS, Lyngb. Charleston, S. C.
ECTOCARPUS VIRIDIS, Harv. Orient, L. I.
ECTOCARPUS FASCICULATUS, Harv. New England coast.
ECTOCARPUS GRANULOSUS, Ag. Santa Cruz, Cal.
ECTOCARPUS HOOPERI, Harv. Greenport, L. I.
DESMARESTIA ACULEATA, Lmx. Eastport, Me.
DESMARESTIA VIRIDIS, Lmx. New York.
DESMARESTIA LIGULATA, Lmx. Monterey, Cal.
PUNCTARIA LATIFOLIA, Grev., and var. *zosteræ*, Le Jolis. Eastport, Me.
PUNCTARIA PLANTAGINEA, Grev. New England.
PHYLLITIS FASCIA, Ktz. Eastport, Me.
SCYTOSIPHON LOMENTARIUS, Ag. Eastport, Me.
CAULERPA PROLIFERA, Lmx. Florida.
CAULERPA CRASSIFOLIA, Ag., var. *Mexicana*. Florida.
CAULERPA PLUMARIS, Ag. Florida.
CAULERPA ASHMEADII, Harv. Key West.
CAULERPA ERICIFOLIA, Ag. Florida.
CAULERPA CUPRESSOIDES, Ag. Key West.
CAULERPA LANUGINOSA, Ag. Key West.
CAULERPA PASPALOIDES, Bory. Florida.
CAULERPA CLAVIFERA, Ag. Florida.
HALIMEDA OPUNTIA, Lmx. Florida.
HALIMEDA TUNA, Lmx. Florida.
HALIMEDA TRIDENS, Lmx. Key West.
UDOTEA FLABELLATA, Lmx. Key West.
UDOTEA CONGLUTINATA, Lmx. Key West.
CODIUM TOMENTOSUM, Stack. Florida; var. *damæcornis*. West coast.
CHLORODESMIS? Key West.
BRYOPSIS PLUMOSA, Lmx. Eastern coast.
BRYOPSIS HYPNOIDES, Lmx. Key West.

VAUCHERIA PILOBOLOIDES, Thuret. Wood's Holl, Mass.
DASYCLADUS OCCIDENTALIS, Harv. Florida.
DASYCLADUS CLAVÆFORMIS, Ag. Key West.
ACETABULARIA CRENULATA, Lmx. Florida.
CYMOPOLIA BARBATA, Lmx. Key West.
CHAMÆDORIS ANNULATA, Mont. Key West.
PENICILLUS DUMETOSUS, Duc. Florida; West Indies.
PENICILLUS CAPITATUS, Lmx. *Mermaid's shaving-brush.* Florida.
BLODGETTIA? CONFERVOIDES, Harv. Key West.
ANADYOMENE FLABELLATA, Lmx. Key West.
DICTYOSPHÆRIA FAVULOSA, Duc. Key West.
ASCOTHAMNION INTRICATUM, Kütz. Key West.
ENTEROMORPHA INTESTINALIS, Link. New England.
ENTEROMORPHA COMPRESSA, Grev. New England.
ENTEROMORPHA CLATHRATA, Grev. New England coast.
ULVA LATISSIMA, Linn. *Sea-lettuce.* New England coast.
ULVA FASCIATA, Delile. California.
CLADOPHORA MEMBRANACEA, Ag. Key West.
CLADOPHORA RUPESTRIS, L. Cape Ann, Mass.
CLADOPHORA ARCTA, Dillw. Cape Ann, Mass.
CLADOPHORA LANOSA, Roth. Orient, L. I.
CLADOPHORA UNCIALIS, Fl. Dan. New England coast.
CLADOPHORA LÆTEVIRENS, Dillw. Key West, Fla.
CLADOPHORA FRACTA, Fl. Dan. Eastern coast.
CHÆTOMORPHA PICQUOTIANA, Mont. Cape Ann, Mass.
CHÆTOMORPHA MELAGONIUM, Web. and Mohr. Cape Ann, Mass.
CHÆTOMORPHA SUTORIA, Berk. Stonington, Conn.
CHÆTOMORPHA BRACHYGONA, Harv. Key West.
CHÆTOMORPHA TORTUOSA, Dillw. Eastport, Me.
HORMOTRICHUM YOUNGANUM, Dillw. New England coast.
LYNGBYA MAJUSCULA, Harv. Cape Cod.
LYNGBYA FERRUGINEA, Ag. New England coast.
LYNGBYA KÜTZUNGIANA, Thur. Eastern coast.
CALOTHRIX CONFERVICOLA, Ag. East coast.
CALOTHRIX SCOPULORUM, Ag. East coast.
SPHÆROZYGA CARMICHAELII, Harv. Wood's Holl, Mass.
PETROCELIS CRUENTA, Ag. Eastport, Me.
SPIRULINA TENUISSIMA, Kütz. Eastport, Me.
CHNOÖSPORA FASTIGIATA, Ag. San Diego, Cal.
HORMACTIS FARLOWI, Bornet. East coast.

Inorganic materials:

——. Scouring-sand. Impure silex for domestic use. Alameda, Cal. H. Hemphill.
——. Glassmaker's-sand. Pure silex. Isle of Shoals, N. H.

COMMERCIAL STATISTICS OF ANIMAL PRODUCTS IN THE UNITED STATES: A REVIEW OF A PORTION OF THE REPORT OF THE CHIEF OF THE BUREAU OF STATISTICS FOR THE FISCAL YEAR ENDING JUNE 30, 1877.

By G. Brown Goode.

The following review of the character and commercial values of animal products used or produced in the United States is intended to supplement and explain in part the preceding "Catalogue of the collection illustrating the animal resources of the United States," made under the direction of the United States National Museum for the International Exhibition of 1876. The statistics have been arranged with a view to a concise exhibition of the extent and location of the trade in all substances of animal origin. The classification is uniform with that employed in the catalogue.

An attempt is made to show—

1. The amount of imports, the countries from which the products are imported, and the ports through which the import entries are chiefly made.

2. The domestic consumption of foreign products. The table of imports entered into consumption is more detailed than any of the others, and from this have been taken many statements which were not elsewhere given, as, for instance, the amounts of coral, whalebone, chemicals, and specimens of natural history.

3. The exports of domestic products, the ports from which they were chiefly shipped, and the countries to which they are sent.

4. The statistics of foreign exports or of the exports of products not directly of domestic origin.

No account has been made of the indirect and transshipment trade.

LIVING ANIMALS.

The total value of living animals brought into the United States does not fall far below $2,200,000.

The value of the miscellaneous importations of living animals is placed at $1,648,465. Of this amount Quebec, Ontario, &c., supply $1,452,457, and Mexico $129,897 (no doubt chiefly sheep), Nova Scotia and New Brunswick send $30,124, Germany $13,262, British Columbia $13,762, England $6,184. The remainder comes from the British East Indies ($1,389), Cuba ($818), Brazil ($133), Scotland, Honduras, Belgium, Chili, China, France, Guiana, Colombia, and Uruguay. The latter countries probably send chiefly animals for menageries and gardens.

Animals for breeding purposes are imported to the amount of $419,170. The larger proportion ($291,960) comes from the British Provinces

through the Lake ports. New York, with its extensive shipments from Europe, receives the next proportionate share ($111,501), then San Francisco ($4,708), Boston ($3,029), Baltimore ($2,113), Philadelphia ($519), and New Orleans ($200).

The teams of emigrants have the right of free entry. The yearly return of entries is placed at $26,070. The greater proportion ($23,520) appears to come from the British Provinces through the Lake ports.

The imports of birds are valued at $109,879. Of this amount, $71,989 comes to New York, and consists principally, no doubt, of singing birds. The Provinces send $38,328, probably, for the most part, fowls.

Leeches are imported to the amount of $4,227. All come through New York, except $133 worth through New Orleans.

The following table, compiled from the "Statement showing quantities and values of foreign merchandise entered into consumption in the United States during the fiscal year ended June 30, 1877, &c." (No. 20, pp. 446–505), while it necessarily does not tally with the figures already given, is instructive, since it shows in fuller detail the numbers and character of the imports of foreign animals:

Description of animal.	Number.	Value.
Horses	9,240	$602,513
Cattle	31,893	314,094
Sheep	282,432	674,883
Hogs	4,534	9,876
Animals for breeding purposes	5,370	416,476
Fowls, land and water	.....	36,793
Birds	.....	73,187
Leeches	.....	4,288
Animals not elsewhere specified	.....	27,737
Total	.....	2,159,847

The domestic exports of living animals are valued at $3,306,308, as shown in the following table:

Description of animal.	Number.	Value.
Horses	2,042	$301,134
Mules	3,441	478,434
Horned cattle	50,001	1,593,080
Sheep	179,017	234,480
Hogs	65,107	699,180
Total	.....	3,306,308

The largest number of horses is shipped from New York (727), next from Brazos de Santiago, Tex. (363), Minnesota (196), San Diego, Cal. (195), Corpus Christi, Tex. (82), Puget Sound, Washington (66), San Francisco (52), and Baltimore (53). The horses shipped from San Francisco are most valuable, being worth $500 on an average; those from New York $150; those from Texas $40.

The principal exports of horses are to Mexico (603) chiefly from Texas, Quebec, Ontario, &c. (391), the British West Indies and Honduras (232), Cuba (157), and the French West Indies and French Guiana (129).

Mules are shipped in the largest numbers from New York (2,058), New Orleans, La. (1,036), Brazos de Santiago, Tex. (116), Saluria, Tex. (92), and Galveston, Tex. (90). They are sent chiefly to the British West Indies and Honduras (1,541), Cuba (1,018), the French West Indies and Guiana (252), the Central American States (210), British Guiana (218), and Mexico (134).

Horned cattle are shipped chiefly from Texas (20,396), Key West, Fla. (9,071), Minnesota (6,615), New York (4,863), Huron, Mich. (4,748), Boston (1,566), Philadelphia (700), Puget Sound, W. T. (611), Detroit, Mich. (543), and San Diego, Cal. (685). They are sent chiefly to Cuba (27,388), Quebec, Ontario, &c. (12,020), England (4,991), Liberia (2,809), and to the British West Indies and Honduras (1,741), the Bermudas taking a large share of the latter.

Sheep are sent principally from Texas (108,747), California (53,438), Washington Territory (9,484), and New York (4,744), and find their way mostly to Mexico (161,549), British Columbia (9,484), British West Indies, (2,299), England (2,692), and Quebec, &c. (1,003). It is sufficiently evident that Texas and California send to Mexico, Washington Territory to British Columbia, and New York and the Atlantic ports to England and the West Indies.

Hogs are exported largely from Detroit, Mich. (34,504), Huron, Mich. (28,508), and Minnesota (339); also, from Puget Sound, W. T., to the British Provinces. Key West, Fla., sends about 230 to Cuba, and Texas 348 to Mexico.

There is a foreign export of living animals to the value of $22,970, chiefly to England ($12,136) and the British West Indies ($8,176). It is chiefly from New York ($20,722).

FOOD PRODUCTS, EXCEPT FISH.

The import entries of food products are placed at $724,452. New York is the chief receptacle of these imports ($508,905), followed by the ports on the Canadian border ($173,007), San Francisco ($53,760), Philadelphia ($32,111), New Orleans ($7,400), Boston ($5,253), and Key West, Fla. ($2,336).

The receipts from Canada ($113,191) correspond nearly to the amount given for the northern border ports, those from China ($43,331) to the entries of San Francisco, and those from Cuba ($2,846) to the entries of Florida. New York and Philadelphia receive nearly all the remainder, which is principally sent by Germany ($325,693), England ($65,164), France ($63,119), Belgium (54,537), the Netherlands ($40,145), Italy ($11,957), and Mexico ($2,679).

The total value of the import of honey is $61,205, of which New York receives the principal share ($34,693), then New Orleans ($13,483) and Boston ($8,019).

Sausages, sausage-skins, and Bologna sausages are imported to the

value of $83,187, of which New York receives over $80,000 and New Orleans over $1,300.

Condensed eggs come only to New York, which imports to the value of $2,529.

Milk comes to the Lake ports to the value of $2,062.

The quantities of each article entered into consumption are shown in the following table:

Articles.	Amount.	Value.
Beef ..... pounds..	213,909	$15,540 92
Mutton	.....	2,413 80
Pork ..... pounds..	42,418	3,111 70
Venison	.....	824 66
Poultry	.....	33,022 94
Salted tongues	.....	112 00
Tripe	.....	116 00
Sausage-skins	.....	55,928 00
Bologna sausages	.....	28,948 40
Bacon and hams ..... pounds..	73,773	14,193 35
Prepared meats, game, and poultry, sealed or unsealed, in cans or otherwise...	.....	28,289 80
Lard ..... pounds..	12,524	1,166 74
Extract of meat	.....	38,124 00
Eggs ..... dozens..	5,048,900	617,643 59
Eggs, condensed	.....	1,873 00
Eggs, yolk of	.....	203 00
Milk, plain	.....	2,614 65
Milk, condensed or preserved	.....	2,798 00
Cheese ..... pounds..	2,719,451	464,001 23
Butter ..... do....	82,131	17,231 00
Honey ..... gallons..	27,017	16,473 50

The following tables show the imports of eggs by countries, and the corresponding entries by customs-districts.

Countries.	Eggs.	
	Dozens.	*Dollars.*
China	126,800	8,716
Hong-Kong	3,066	183
Nova Scotia, New Brunswick, &c	948,703	109,823
Quebec, Ontario, &c	3,969,302	498,825

Countries.	Eggs.	
	Dozens.	*Dollars.*
British Columbia	100	6
British West Indies and British Honduras	300	69
Total	5,048,271	617,622

Districts.	Eggs.	
	Dozens.	*Dollars.*
Aroostook, Me	5,000	750
Boston and Charlestown, Mass.	639,932	75,665
Buffalo Creek, N. Y	1,325,608	180,222
Cape Vincent, N. Y	6,718	787
Champlain, N. Y	144,891	19,504
Cuyahoga, Ohio	25,539	2,595
Detroit, Mich	77,019	9,038
Erie, Pa	918	107
Frenchman's Bay, Me	10,269	1,096
Genesee, N. Y	4,372	464
Georgetown, D. C	979	124
Key West, Fla	1,665	208
Michigan, Mich	118	24
Mobile, Ala	150	18
Newark, N. J	70	8
New Bedford, Mass	704	83
New Orleans, La	1,120	109

Districts.	Eggs.	
	Dozens.	*Dollars.*
Newport, R. I	733,817	86,815
Norfolk and Portsmouth, Va.	934,427	108,320
Oregon, Oreg	45,347	4,818
Pamlico, N. C	321,567	35,489
Pensacola, Fla	300	69
Philadelphia, Pa	1,044	133
Plymouth, Mass	3,200	383
Portsmouth, N. H	100	6
Puget Sound, Wash	1,045	117
Richmond, Va	90	10
Saco, Me	126,800	8,716
Savannah, Ga	612,296	81,751
Superior, Mich	100	10
Vermont, Vt	3,066	183
Total	5,048,271	617,622

The amount of domestic exports is shown in the following table:

Articles.		Amount.	Value.
Beef, fresh	pounds	40, 210, 990	$4, 552, 528
Beef, salted	do	39, 155, 153	2, 950, 952
Mutton	do	349, 368	36, 480
Pork	do	69, 671, 894	6, 296, 414
Bacon and hams	do	460, 057, 146	49, 512, 412
Preserved meats			3, 939, 977
Lard	pounds	234, 741, 223	25, 562, 665
Eggs	dozens	32, 591	8, 429
Condensed milk			123, 801
Cheese	pounds	107, 364, 666	12, 700, 627
Butter		21, 527, 242	4, 424, 616
Total			110, 108, 916

Fresh beef is shipped as follows:

Ports.		Amount.	Value.
New York	pounds	39, 230, 400	$3, 608, 940
Philadelphia	do	9, 896, 260	933, 249
Boston	do	81, 000	10, 000
Portland	do	3, 330	334
Total		49, 210, 990	4, 552, 523

All the fresh beef goes to England and Scotland. The former receives 39,906,940 pounds, valued at $3,614,779, and the latter 9,304,050 pounds, valued at $937,744.[1]

Salted beef goes principally from New York, Philadelphia, Boston, Baltimore, San Francisco, Portland, and Brazos de Santiago, Tex., and is sent to almost every country, England (19,727,882 pounds), Scotland (5,887,774), the British West Indies (2,774,804), Germany (2,185,990), Nova Scotia and New Brunswick (1,297,662), and British Guiana (1,042,150) receiving the largest proportion.

Mutton goes from New York to England (219,928 pounds) and Scotland (129,440).

Pork goes chiefly from New York (39,239,234 pounds), Boston (10,763,062), Huron, Mich. (7,748,660), Baltimore (3,961,045), Philadelphia (2,144,761), and Portland (2,930,359) to England (19,793,191), the British North American Provinces (17,990,540), the British West Indian Provinces (9,867,490), Scotland (2,847,346), Porto Rico (2,923,975), Germany (1,251,166), and the Dutch West Indies (1,126,169), as well as to all other quarters of the globe.

Bacon and hams go chiefly from New York (253,481,647 pounds), Boston (112,656,704), Philadelphia (72,738,161), Portland (10,541,136), Baltimore (6,146,098), and Huron, Mich. (2,275,004), to England (322,016,729), Scotland (31,193,969), Belgium (30,846,038), Germany (23,715,093), France (23,167,236), Cuba (10,813,912), Sweden and Norway (5,278,228), Netherlands (4,442,709), the British Provinces (3,632,464), the British West

[1] The Journal of the Royal Agricultural Society of England (1877) states the import of fresh beef from New York and Philadelphia in the first four months of 1877 (22,812,128 pounds) to have exceeded the whole import of the preceding year (19,838,895 pounds).

Indies (1,241,484), Spain (1,004,849), and in smaller quantities to almost every other country.

Preserved meats go chiefly from New York ($3,066,538), Galveston, Tex. ($359,063), Boston ($186,013), Oregon ($115,321), and San Francisco ($114,531) to England ($2,189,688), Scotland ($1,222,285), Germany ($159,059), France ($126,619), and the British West Indies ($46,480).

Lard goes chiefly from New York (166,924,255 pounds), Boston (29,380,349), Philadelphia (11,682,146), Baltimore (11,672,057), Portland (7,744,890), and Huron, Mich. (5,425,731), to England (66,196,750), Scotland (58,038,751), Belgium (23,882,271), France (23,788,669), Cuba (21,665,367), Scotland (8,096,852), British Provinces (6,115,553), Netherlands (5,597,166), United States of Colombia (4,549,995), Brazil (4,267,310), Venezuela, Spanish Africa, Hayti, and numerous other countries.

Eggs go from New York (12,211 dozens), Washington Territory (8,971), and the Canadian boundary (9,359) to the British Provinces (18,895), England (4,200), and Porto Rico (9,024).

Condensed milk goes from New York ($94,246), San Francisco ($24,606), and Baltimore ($1,325) to the British possessions in Australasia ($37,509), England ($30,727), Japan ($12,984), British West Indies ($8,592), China ($8,196), Cuba ($4,746), Brazil ($2,495), British Columbia ($2,465), Central America ($1,754), and Hayti ($1,248).

Cheese goes chiefly from New York (103,251,661 pounds), Philadelphia (1,456,868), Boston (1,172,522), and Huron, Mich. (1,116,320), to England (95,871,379), Scotland (1,100,099), and the English colonies, with small quantities to other countries.

Butter goes chiefly from New York (16,771,663 pounds), Boston (2,284,619), and Philadelphia (1,141,224) to England (10,504,640), Scotland (4,526,737), the British West Indies (1,277,945), Scotland (1,237,978), the British Provinces, Cuba, Porto Rico, Hayti, the Netherlands, Colombia, Venezuela, and the Danish West Indies.

The foreign exports of provisions amount to $64,478, chiefly from New York to England, Cuba, Mexico, British Columbia, Central and South America.

FISH.

The quantity of fish imported not subject to duty is shown in the following table. The total value is $1,400,736.

Countries.	Fresh, of all kinds.		Herring, pickled.		Mackerel, pickled.		All other
	Pounds.	Dollars.	Barrels.	Dollars.	Barrels.	Dollars.	Dollars.
Nova Scotia, New Brunswick, &c	4,584,678	128,660	49,033	152,293	43,053	372,127	512,047
Quebec, Ontario, &c	2,570,033	94,780	2,218	13,242	13	133	27,337
British Columbia	1,270	58	.....	.....	.....	.....	.....
Newfoundland and Labrador	630,000	12,600	12,029	45,251	.....	.....	180
Hayti	.....	.....	.....	.....	.....	.....	532
Mexico	.....	.....	.....	.....	.....	.....	294
	7,735,981	236,098	63,280	210,786	43,066	372,260	540,300

The remainder of the import subject to duty is shown in the next table. The total value is $1,054,748.

Countries.	Sardines and anchovies, preserved in oil or otherwise.		Herring, pickled.		Mackerel, pickled.		All other.
	Pounds.	Dollars.	Pounds.	Dollars.	Pounds.	Dollars.	Dollars.
Belgium		20	167	2,368			16
China							47,089
Hong-Kong							761
France		685,164					913
French Possessions							4
Germany		5,266	4,726	61,676			7,098
England		77,317	98	1,277			7,120
Scotland			49	698			169
Nova Scotia, New Brunswick, &c			84	568	8	105	335
Quebec, Ontario, &c		6	24	35	6	43	19,691
British Columbia							2,439
British West Indies and British Honduras							5
Hawaii							35
Italy		969					176
Japan							175
Mexico							1,101
Netherlands		4,464	9,476	121,254			1,977
Spain		42					63
Cuba		83	2	22			1,356
Sweden and Norway			247	1,717			1,134
		773,331	14,873	189,615	14	148	91,654

The amounts of Canadian fish not liable to duty received in the various customs-districts are shown below:

Districts.	Fish, not of American fisheries.						
	Fresh, of all kinds.		Herring, pickled.		Mackerel, pickled.		All other, not elsewhere specified.
	Pounds.	Dollars.	Barrels.	Dollars.	Barrels.	Dollars.	Dollars.
Baltimore, Md	1,500	85	1,884	7,605	88	314	392
Boston and Charlestown, Mass	473,556	15,465	46,150	157,108	34,730	300,690	176,147
Buffalo Creek, N. Y	378,869	13,154	328	1,862			
Cape Vincent, N. Y	474,798	15,433					
Champlain, N. Y	191,033	14,338	84	524	13	133	1,405
Cuyahoga, Ohio	12,720	509					
Detroit, Mich	652,703	19,084					
Erie, Pa	5,400	227					
Genesee, N. Y	36,240	1,443					
Gloucester, Mass			1,010	2,010			12,199
Huron, Mich	46,813	1,234	1,418	8,054			735
Key West, Fla							258
Machias, Me							116
Marblehead, Mass			6	12	4	15	99
Minnesota, Minn	200	10					
Newburyport, Mass							51
New York, N. Y	2,610,000	52,200	2,115	8,961	1,823	15,656	217,563
Niagara, N. Y	159,057	7,561					
Oswegatchie, N. Y	6,800	480					19
Oswego, N. Y	184,244	7,471					
Passamaquoddy, Me	1,331,353	63,844	6,726	9,885	4,974	44,031	55,320
Philadelphia, Pa							2,529
Portland and Falmouth, Me	747,579	9,676	2,661	11,163	1,480	11,405	87,721
Puget Sound, Wash	1,270	58					
Richmond, Va							24
Salem and Beverly, Mass			510	800	4	16	811
Sandusky, Ohio	212,540	3,545					
San Francisco, Cal							154
Savannah, Ga							50
Superior, Mich	118,614	2,459					830
Vermont, Vt	90,692	7,822	388	2,802			24,398
Waldoboro', Me							90
Willamette, Oreg							681
Total	7,735,981	236,098	63,280	210,786	43,066	372,260	581,592

The entries by customs-districts of fish not from Canada and dutiable are shown below:

Districts.	Fish, not of American fisheries.		Mackerel, pickled.		Sardines and anchovies preserved in oil.	All other, not elsewhere specified.
	Herring, pickled.					
	Barrels.	Dollars.	Barrels.	Dollars.	Dollars.	Dollars.
Baltimore, Md	338	2,086	.....	.....	309	809
Boston and Charlestown, Mass	2	28	.....	.....	43,130	99
Brazos de Santiago, Tex	1	12	.....	.....	417	186
Buffalo Creek, N. Y	21	21	.....	.....	.....	2,952
Cape Vincent, N. Y	.....	.....	.....	.....	.....	5
Champlain, N. Y	1	6	.....	.....	.....	5
Cuyahoga, Ohio	.....	.....	.....	.....	.....	20
Detroit, Mich	.....	.....	.....	.....	.....	11,383
Galveston, Tex	.....	.....	.....	.....	1,682	.....
Genesee, N. Y	.....	.....	.....	.....	.....	6
Huron, Mich	3	8	6	43	2	4
Key West, Fla	.....	.....	.....	.....	67	1,118
Michigan, Mich	.....	.....	.....	.....	.....	52
New Orleans, La	45	770	.....	.....	65,188	4,554
New York, N. Y	14,428	185,926	.....	.....	578,923	11,379
Niagara, N. Y	.....	.....	.....	.....	.....	4,464
Oswegatchie, N. Y	.....	.....	.....	.....	.....	52
Philadelphia, Pa	34	158	8	105	1,475	1,083
San Diego, Cal	.....	.....	.....	.....	.....	804
Sandusky, Ohio	.....	.....	.....	.....	.....	238
San Francisco, Cal	.....	.....	.....	.....	82,134	51,085
Superior, Mich	.....	.....	.....	.....	4	310
Vermont, Vt	.....	.....	.....	.....	.....	200
Willamette, Oreg	.....	.....	.....	.....	.....	706
Total	14,873	189,615	14	148	773,331	91,654

The next table shows the amount of fish entered into consumption:

Description.	Quantity.	Dollars.
Fish, the product of the sea-fisheries of the Dominion of Canada, Newfoundland, &c., under treaty of May 8, 1871, act of March 1, 1875, and not dutiable:		
Fresh, for immediate consumption ..... pounds..	13,453,033	315,858 10
Herring, pickled ..... barrels..	61,791.50	207,090 55
Herring, dried or smoked ..... boxes..	316,870.50	39,459 42
Mackerel, pickled ..... barrels..	44,169.50	373,792 38
Salmon, pickled ..... do....	21,677	62,393 00
Salmon, dried or smoked ..... pounds..	37,069	3,704 00
Shell-fish and turtles	.....	1,727 55
Other fish, pickled ..... barrels..	16,004.25	90,796 00
Other fish, dried or smoked ..... pounds..	5,645,357	229,061 00
Prepared or preserved in cans, or otherwise than in oil	.....	19,203 76
Fish, dutiable:		
Herrings, pickled or salted ..... barrels..	14,907	190,431 00
Fish, in oil or preserved, except anchovies or sardines	.....	15,996 00
Mackerel ..... barrels..	8½	105 00
Other fish, pickled ..... do....	385½	2,458 00
Other fish, pickled ..... pounds..	690,856	48,200 00
Fish prepared in cans	.....	7,271 60
Pickled salmon ..... barrels..	½	9 00
Sardines and anchovies, packed in oil or otherwise in tin boxes:		
Whole boxes, 5 × 4 × 3½ inches	3,813	2,338 00
Half boxes, 5 × 4 × 1⅞ inches	264,285	48,044 00
Quarter boxes, 4¾ × 3⅛ × 1⅛	7,985,401	661,597 25
In any other form	.....	11,018 25
		722,997 50
Oysters, dried	.....	13,447 00

The following table shows the amount of domestic exports of fish:

Description.	Quantity.	Dollars.
Fish, fresh		$114,338
Dried or smoked	15,964,800 pounds	791,785
Pickled	76,227 do	486,738
Other, cured	234,741,233 do	25,562,665
Oysters		260,660
		27,456,236

The following table shows the amount of exports by districts:

Districts.	Fish, dried or smoked.		Fish, fresh.	Fish, pickled.		Fish, other cured.	Oysters.	
	Cwt..	Dollars.	Dollars.	Barrels.	Dollars.	Dollars.	Bush.	Dolls.
Alaska, Alaska	13	66	.....	2	16	142	.....	108
Baltimore, Md	355	1,395	.....	670	4,745	31,521	.....	27,384
Bangor, Me	4	20	.....	.....	.....	1,046	.....	.....
Bath, Me	.....	.....	.....	361	696	.....	.....	.....
Belfast, Me	6	20	84	42	258	47	.....	.....
Boston and Charlestown, Mass	78,815	349,408	222	26,150	171,078	117,225	.....	7,115
Brazos de Santiago, Tex	31	362	143	3	31	242	.....	593
Buffalo Creek, N. Y	.....	.....	.....	.....	.....	.....	.....	2,239
Cape Vincent, N. Y	.....	.....	.....	.....	.....	60	.....	3,967
Champlain, N. Y	.....	.....	.....	100	1,000	.....	.....	14,443
Corpus Christi, Tex	2	21	.....	.....	.....	.....	.....	4
Cuyahoga, Ohio	1	15	.....	.....	.....	17	.....	50
Detroit, Mich	312	1,200	2,071	.....	.....	5,021	.....	4,858
Duluth, Minn	.....	.....	.....	1	7	.....	.....	.....
Galveston, Tex	.....	.....	.....	.....	.....	13	.....	.....
Genesee, N. Y	.....	4	.....	.....	.....	.....	467	.....
Gloucester, Mass	90	200	.....	11,338	54,016	391	.....	.....
Huron, Mich	.....	.....	.....	.....	.....	2,491	468	.....
Key West, Fla	.....	.....	60,200	.....	.....	13,547	.....	.....
Machias, Me	98	187	.....	.....	.....	.....	.....	.....
Minnesota, Minn	.....	.....	.....	.....	.....	1,861	1,921	837
New Bedford, Mass	67	329	.....	.....	.....	.....	.....	.....
Newburyport, Mass	2,371	9,796	.....	.....	.....	.....	.....	.....
New Haven, Conn	27	78	.....	.....	.....	.....	.....	.....
New Orleans, La	36	195	.....	9	68	2,193	39	10
New York, N. Y	64,002	368,779	.....	24,357	188,415	313,642	.....	.....
Norfolk, Va	.....	.....	.....	.....	.....	19	164,552	10,297
Oregon, Oreg	.....	.....	.....	299	2,709	693,125	320	.....
Oswegatchie, N. Y	12	72	.....	.....	.....	2,582	.....	.....
Oswego, N. Y	.....	.....	.....	.....	.....	500	21,914	.....
Passamaquoddy, Me	.....	.....	.....	2,312	6,000	.....	.....	.....
Pensacola, Fla	.....	.....	.....	9	18	36	1,049	792
Philadelphia, Pa	.....	.....	.....	333	2,415	191,442	.....	.....
Plymouth, Mass	1,500	6,000	.....	.....	.....	.....	.....	.....
Portland, Me	2,590	10,845	.....	8,650	44,155	25,413	178	7
Providence, R. I	557	1,942	.....	2	19	.....	.....	.....
Puget Sound, Wash	.....	.....	.....	.....	.....	108	1,550	.....
Salem and Beverly, Mass	5,643	20,085	27	461	2,960	82	.....	.....
Saluria, Tex	.....	.....	.....	.....	.....	.....	1,009	31,343
San Francisco, Cal	448	3,140	.....	327	2,607	1,066,435	.....	5
Savannah, Ga	1	8	2	51	211	.....	.....	.....
Vermont, Vt	2,667	17,609	51,589	118	621	9,255	6,169	.....
Willamette, Oreg	.....	.....	.....	632	4,693	7,719	200	.....
Total	159,648	791,785	114,338	76,227	486,738	2,486,225	260,620	45,361
Additions to Niagara and Vermont, taken from Canadian reports	.....	189,151	.....	.....	.....	.....	170,610	3,162
Grand total	.....	980,936	.....	.....	.....	.....	431,230	48,523

The following table shows the amounts of domestic exports of fish by countries:

Countries.	Fish, dried or smoked.		Fish, fresh.	Fish, pickled.		Fish, other cured.	Oysters.
	Cwt.	Dollars.	Dollars.	Barrels.	Dollars.	Dollars.	Dollars.
Argentine Republic	.....	.....	.....	.....	.....	.....	812
Belgium	.....	.....	.....	6	60	779	12
Brazil	.....	.....	.....	50	541	309	1,841
Central American States	195	1,316	.....	121	857	5,039	240
Chili	.....	.....	.....	.....	.....	3,429	2,555
China	45	343	.....	.....	.....	2,572	.....
Denmark	.....	.....	.....	2,312	6,000	.....	.....
Danish West Indies	170	624	.....	395	2,302	2,489	402
France	.....	.....	.....	.....	.....	43,367	236
French West Indies and French Guiana	19,939	84,228	27	2,714	18,480	7,286	34
French Possessions in Africa and adjacent islands	.....	.....	.....	.....	.....	612	.....
French Possessions, all other	22	163	.....	270	2,197	13,653	50
Germany	86	380	.....	170	1,042	72,536	18,420
Great Britain: England	242	912	.....	746	4,151	1,587,457	118,634
Scotland	.....	.....	.....	1,030	4,700	5,514	2,667
Nova Scotia, New Brunswick, and Prince Edward Island	9,592	41,352	.....	2,046	12,137	50	5,093
Quebec, Ontario, Rupert's Land, and the Northwest Territory	2,992	18,900	53,660	219	1,628	21,787	56,516
British Columbia	87	696	.....	2	16	2,453	1,849
Newfoundland and Labrador	70	350	.....	.....	.....	220	68
British West Indies and British Honduras	5,084	27,769	86	5,540	33,006	25,289	1,491
British Guiana	940	4,886	222	1,478	9,289	1,090	809
Hong-Kong	104	689	.....	.....	.....	291,606	38
British Possessions in Africa	815	3,474	.....	81	866	841	183
British Possessions in Australasia	.....	.....	.....	626	4,652	207,463	32,143
Hawaiian Islands	90	644	.....	926	7,352	17,701	2,992
Hayti	62,387	372,025	.....	29,737	225,949	31,344	482
Italy	10	60	.....	.....	.....	.....	.....
Japan	55	406	.....	.....	.....	2,523	43
Liberia	371	1,238	.....	430	3,117	3,048	.....
Mexico	42	443	143	4	43	5,967	3,494
Netherlands	1	7	.....	6	56	.....	72
Dutch West Indies	24,994	77,818	.....	2,102	11,416	3,435	437
Peru	72	315	.....	.....	.....	14,315	.....
Portugal	.....	.....	.....	1	10	20	.....
Azore, Madeira, and Cape Verde Islands	611	3,295	.....	13	141	360	.....
Portuguese Possessions in Africa and adjacent islands	22	90	.....	.....	.....	66	.....
Russia, Asiatic	.....	.....	.....	.....	.....	27	.....
San Domingo	3,490	19,503	.....	2,112	16,534	6,757	14
Cuba	18,483	87,687	60,200	588	5,146	65,491	3,905
Porto Rico	5,729	24,077	.....	1,258	8,137	8,112	145
Spanish Possessions in Africa and adjacent islands	.....	.....	.....	.....	.....	384	.....
Sweden and Norway	196	760	.....	20,516	101,492	4,400	.....
United States of Colombia	1,997	12,142	.....	715	5,232	13,980	224
Uruguay	.....	.....	.....	.....	.....	1,117	2,157
Venezuela	710	5,160	.....	13	129	7,256	1,381
All other islands and ports, not elsewhere specified	5	33	.....	.....	.....	4,551	181
Total	159,648	791,785	114,138	76,227	486,738	2,486,225	260,620
Additions taken from Canadian reports	.....	189,151	.....	.....	.....	.....	170,610
Grand total	.....	980,936	.....	.....	.....	.....	431,230

One thousand nine hundred and three barrels of pickled herring, valued at $9,088, passed through Boston to Sweden and Norway as a foreign export.

Miscellaneous fish to the value of $32,120 goes as foreign export to England ($22,098), Nova Scotia and New Brunswick ($5,795), the French West Indies ($3,932), Quebec, Ontario, &c. ($215), and Australasia ($80). Of this amount Boston sends the most ($31,905) and Portland the remainder ($215).

The following table shows the foreign exports of fish:

Countries.	Fish, not of American fisheries.			
	Herring, pickled.		Sardines and anchovies, preserved in oil.	All other, not elsewhere specified.
	Barrels.	Dollars.	Dollars.	Dollars.
Central American States	.....	.....	1,296	48
China	.....	.....	.....	805
France	.....	.....	1,811	2,033
French Possessions, all other	.....	.....	630	7
Germany	.....	.....	.....	636
Great Britain: England	.....	.....	.....	33,956
Nova Scotia, New Brunswick, and Prince Edward Island	.....	.....	193	666
Quebec, Ontario, Manitoba, Rupert's Land, &c	.....	.....	16,930	.....
British Columbia	.....	.....	288	529
British West Indies and Honduras	.....	.....	187	.....
British Possessions: Hong-Kong	.....	.....	.....	470
British Possessions in Australasia	.....	.....	.....	4,333
Hawaiian Islands	.....	.....	.....	95
Mexico	2	22	2,366	181
Peru	.....	.....	.....	473
San Domingo	.....	.....	521	.....
Cuba	.....	.....	25	91,489
United States of Colombia	.....	.....	56	133
Venezuela	.....	.....	477	.....
Total	2	22	24,780	135,854

FURS.

The value of the import of undressed fur-skins is shown in the next table:

Imports of fur-skins undressed.

Argentine Republic	$38,026
Belgium	2,082
China	77
France	2,696
French West Indies and French Guiana	204
Germany	82,044
England	359,351
Scotland	1,922
Nova Scotia, New Brunswick, &c	3,435
Quebec, Ontario, &c	789,591
British Columbia	162,558
Newfoundland and Labrador	72
British West Indies and British Honduras	270
British Possessions in Australasia	491
Japan	114,657
United States of Colombia	4,056
Uruguay	134
Total	1,561,666

The value of the imports of furs and dressed fur-skins is shown in the following table:

England	$1,085,376
France	781,769
Germany	378,643
Quebec, Ontario, &c	76,694
Belgium	60,781
Sweden and Norway	8,252
Scotland	5,538
Netherlands	3,319
United States of Colombia	375
Carried forward	2,400,747

Brought forward	$2,400,747
Nova Scotia, New Brunswick, &c	281
British Possessions in Australasia	239
Russia on the Baltic and White Seas	178
China	115
Spain	63
Newfoundland and Labrador	52
Austria	43
British West Indies and British Honduras	38
Hong-Kong	17
Cuba	14
Total	2,401,778

Furs are imported chiefly to New York ($2,142,947), Philadelphia ($93,713), Boston ($72,625), Montana and Idaho (from the Hudson's Bay Territory, of course) ($69,051), and San Francisco ($11,874).

The value of fur-skins and furs entered into consumption is shown in the following table:

Fur-skins of all kinds, not dressed in any manner	$1,544,893 89
Furs, and manufactures of:	
Dressed, on the skin	1,044,930 23
Dressed, partially on the skin	198 10
Dressed, not on the skin, hatters', and others	1,229,322 64
Hares', undressed, and not on the skin	8,178 00
Hats, caps, muffs, and tippets of fur, and all other manufactures of fur, or of which fur shall be the component of chief value	97,942 87
Total	3,925,467 73

Sheep and lamb skins tanned with the wool on are imported to the Lake ports to the amount of $22,232.

The domestic export of furs amounts to $3,836,579. The amount of this export, by customs-districts, and by countries, is shown in the following table:

Districts.	Furs and fur-skins. Dollars.
Alaska, Alaska	20,900
Baltimore, Md.	16,300
Boston and Charlestown, Mass.	138,468
Champlain, N. Y.	28,640
Detroit, Mich.	829
Duluth, Minn.	16
Huron, Mich.	600
New York, N. Y.	2,777,050
Niagara, N. Y.	210
Oswegatchie, N. Y.	1,728
Philadelphia, Pa.	757,986
Puget Sound, Wash	16,707
San Francisco, Cal	29,337
Vermont, Vt.	21
Willamette, Oreg	10
Total	3,788,802
Additions to Niagara and Vermont, taken from Canadian reports	47,777
Grand total	3,836,579

Countries.	Furs and fur-skins. Dollars.
Belgium	605
France	8,397
Germany	1,099,380
Great Britain: England	2,606,253
Scotland	2,200
Nova Scotia, New Brunswick, and Prince Edward Island	1,250
Quebec, Ontario, Rupert's Land, and the Northwest Territory	32,044
British Columbia	37,617
British Possessions in Australasia	200
Japan	437
Netherlands	200
Venezuela	219
Total	3,788,802
Additions taken from Canadian reports	47,777
Grand total	3,836,579

Fur-skins, undressed, are sent as foreign exports to the amount of $118,089: to England $105,020, Germany $9,214, France $3,227, and

Hong-Kong $625. All passes through New York, except the Hong-Kong shipment, which goes through San Francisco.

There is also a foreign export of furs to the value of $52,199: to Quebec, &c., $37,518, England $8,025, Mexico $2,667, France $2,136, and Germany $1,296. It passes almost entirely through New York.

WOOL.

The importation of unmanufactured wool amounts to 42,171,192 pounds, valued at $7,156,944. The value of manufactures of wool (exclusive of hats) is $25,601,922. The details of this importation are given below:

Countries.	Wool, sheep's, and hair of the alpaca, goat, and other like animals, and manufactures of.													
	Unmanufactured.		Cloths and cassimeres.	Woolen rags, shoddy, mungo, waste, and flocks.		Shawls.	Blankets.	Carpets.		Dress-goods.		Hosiery, shirts, and drawers.	Other manufactures of, not elsewhere specified.
	Pounds.	Dollars.	Dollars.	Pounds.	Dollars.	Dollars.	Dollars.	Sq. yards.	Dollars.	Sq. yards.	Dollars.	Dollars.	Dollars.
Argentine Republic	8,166,025	1,050,262											
Austria	246,835	48,536						63	104				877
Belgium	93,108	17,343	316,478	7,780	857	449	4	564	797	50	9		5,240
Brazil	969,526	118,209											323
Chili	2,600,643	294,586					10						
China							27						2,433
France	469,160	52,788	1,394,581	17,513	7,501	553,832	307	20,113	42,411	14,635,712	4,512,730	38,670	1,132,690
French Possessions in Africa, &c	514	54											
Germany	90,106	20,833	1,570,778	27,615	10,795	75,619	70	5,928	19,706	2,710,387	675,393	159,112	1,197,339
England	14,170,171	2,821,259	3,293,233	116,591	14,082	641,326	9,003	490,587	573,731	32,299,504	7,359,923	359,581	1,578,510
Scotland	100,425	11,939	5,898			23,766	8	11,928	29,171	16	5	2,525	15,059
Ireland			15										
Nova Scotia, New Brunswick, &c	64,040	12,970	153	390	28					85	39	6	1,112
Quebec, Ontario, &c	2,265,631	668,139	1,552	30	2	38	61	966	419	4,183	1,716	27	5,202
British Columbia	13,408	1,477	91				410						228
British West Indies and British Honduras	349	36	4				2			42	6		16
British East Indies	359,763	55,562	40			3,044		201	519				1,561
Hong-Kong	14,110	1,038				35							153
British Possessions in Africa, &c	3,063,557	485,710											
British Possessions in Australasia	2,936,892	711,845					27						405
Greece	657,648	68,340											
Hawaii	950	227											
Italy	50	5						18	91			11	283
Mexico	1,405,983	119,708	44			9	10	47	131	3	1	8	204
Netherlands			42,042			5		2,308	5,891				7,030
Dutch West Indies and Dutch Guiana	43,706	3,958											
Azore, Madeira, and Cape Verde Islands	4,726	587											16
Russia on the Baltic and White Seas													139
Russia on the Black Sea	1,503,703	199,253											
Spain						6							
Cuba	2,675	87								132	45		6
Sweden and Norway												1	1,889
Turkey in Europe	343	11						816	1,040				124
Turkey in Asia	106,786	11,879											290
Turkey in Africa													802
United States of Colombia	612,407	73,636											
Uruguay	2,185,884	298,765											
Venezuela	22,069	1,902											
Total	42,171,192	7,156,944	6,624,909	169,925	33,265	1,298,129	9,939	533,539	674,011	49,650,114	12,549,867	559,941	3,951,861

The imports of adhesive felt are valued at $28,273. This substance comes chiefly to New York and San Francisco. The import of roofing felt amounts to $5,299.

The exports of wool and woolen manufactures, by customs-districts and countries, is shown below:

Districts.	Wool, and manufactures of.				
	Wool, raw and fleece.		Carpets.		Other manufactures of.
	Pounds.	Dollars.	Yards.	Dollars.	Dollars.
Alaska, Alaska					85
Baltimore, Md					5
Boston and Charlestown, Mass	2,505	762			3,922
Brazos de Santiago, Tex					3,456
Cape Vincent, N. Y					365
Champlain, N. Y	6,500	1,900	14,570	9,875	82,327
Corpus Christi, Tex					2,625
Detroit, Mich	2,175	870	420	462	490
Duluth, Minn					455
Machias, Me			100	125	225
Miami, Ohio	58,219	18,293			
Newburyport, Mass					1,981
Oregon, Oreg	10,200	4,621	1,404	1,407	91,310
Portland, Me					25,982
Richmond, Va			4,345	3,475	6,982
Salem and Beverly, Mass			2,480	829	19,255
San Diego, Cal					6,293
Savannah, Ga					924
Superior, Mich			130	174	19,379
Waldoboro', Me			30	30	8,135
Willamette, Oreg					23
Wilmington, N. C					1,241
Total	79,509	26,446	23,479	16,377	275,460
Additions to Niagara and Vermont, taken from Canadian reports		670,008			161,106
Grand total		696,454			436,566

Countries.	Wool, and manufactures of.				
	Wool, raw and fleece.		Carpets.		Other manufactures of.
	Pounds.	Dollars.	Yards.	Dollars.	Dollars.
Argentine Republic					336
Brazil					1,063
Central American States					309
China					4,233
France					300
French West Indies and French Guiana					140
Miquelon, Langley, and St. Pierre Islands					950
French Possessions in Africa and adjacent islands					23
French Possessions, all other					1,297
Germany			50	75	24,510
Great Britain: England	10,200	4,621	4,345	3,475	51,214
Scotland					108
Nova Scotia, New Brunswick, and Prince Edward Island	2,505	762	2,480	829	45,959
Quebec, Ontario, Rupert's Land, and the Northwest Territory	66,894	21,063	15,120	10,492	93,978
British Columbia					13,897
Newfoundland and Labrador					64
British West Indies and British Honduras			395	495	2,297
British Guiana					1,297
Hong-Kong					3,233
Hawaiian Islands					4,432
Hayti			25	25	199

Countries.	Wool, and manufactures of.				
	Wool, raw and fleece.		Carpets.		Other manufactures of.
	Pounds.	Dollars.	Yards.	Dollars.	Dollars.
Italy					332
Japan			100	150	2,940
Liberia			138	121	
Mexico			55	60	14,469
Netherlands					170
Dutch West Indies					127
Portugal					275
Azore, Madeira, and Cape Verde Islands					1,244
Portuguese Possessions in Africa and adjacent islands					100
Cuba			10	21	2,225
United States of Colombia			85	96	1,153
Uruguay					1,040
Venezuela			676	538	1,404
All other islands and ports, not elsewhere specified					142
Total	79,599	26,446	23,479	16,377	275,460
Additions taken from Canadian reports		670,008			161,106
Grand total		696,454			436,566

The foreign export of woolen manufactures amounts to $373,753, that of unmanufactured wool to $472,519 (3,088,957 pounds), chiefly to Canada ($445,134), France ($23,835), and England ($3,550).

SILK.

The imports of raw silk are shown in the following table:

Silk, raw.	Pounds.	Dollars.
China	44,281	233,390
France	133,108	1,017,339
Germany	2,192	18,403
England	179,891	1,113,832
Italy	2,282	19,979
Japan	819,056	4,371,886
Hong-Kong	5,360	18,108
	1,186,170	6,792,937

Raw silk comes entirely to San Francisco (861,166 pounds), New York (324,328), and Philadelphia (676).

A foreign export of raw silk (38,515 pounds), valued at ($209,709), goes to England (37,018 pounds), France (1,000), and Quebec. It passes chiefly through New York.

The import of manufactures of silk is shown below:

Countries.	Silk, manufactures of.		
	Dress and piece goods.	Hosiery.	Other manufactures of.
	Dollars.	Dollars.	Dollars.
Austria			9
Belgium	9,000	10	44,217
Brazil	11		
China	672		80,249
France	10,608,762	3,060	2,098,170
Germany	4,169,604	39,861	1,178,266
England	1,667,826	35,559	1,567,508
Scotland	9,247	450	5,975
Ireland			312
Nova Scotia, New Brunswick, &c	77		57
Quebec, Ontario, &c	610		2,273
British Columbia	6		160
British Guiana			237
British East Indies	82		889
Hong-Kong	37		4,518
British Possessions in Australasia			51
Hayti			60
Italy	329		411
Japan	174		8,925
Mexico	4		69
Netherlands	284,235		6,531
Russia on the Baltic and White Seas			544
Spain			127
Cuba	68		278
Porto Rico			24
Sweden and Norway			64
Turkey in Africa			359
United States of Colombia	82		10
Total	16,750,826	78,940	5,000,393

Almost the entire imports of this class come to New York.

The amount of silk and manufactures of silk entered into consumption is shown in the following table:

Description.	Amount.	Dollars.
Silk:		
Cocoons		222,633 00
Raw, or as reeled from the cocoons ..... pounds	1,186,245	6,793,710 00
Waste		168,256 00
Worms' eggs		1,012,624 00
Manufactures of all kinds		10,230,655 79
Manufactures, such as velvet, of which silk is the component of chief value		5,510,178 87

The import of silk waste amounts to $166,646. New York receives $84,414; San Francisco, $81,232.

The import of silk-worm eggs and cocoons amounts to $1,235,283. San Francisco receives $10,818,447; New York, $216,836.

The foreign export of silk manufactures amounts to $199,593.

IVORY.

The amount of ivory and manufactures of ivory entered into consumption is shown in the following table:

Ivory, manufactured	$339,863
Ivory, manufactures of, not otherwise provided for	34,067
Ivory or bone dice, draughts, chess-men, chess-balls, and bagatelle-balls	2,235
Total	376,166

The total import of ivory amounts to $379,402. New York receives $333,727, Boston $21,938, Baltimore $20,043, Philadelphia $2,749, San Francisco $965.

HORN.

The total value of the importation of horns, horn-tips, and horn-strips is $285,368, of which $240,487 comes to New York, $35,352 to Boston, $4,720 to the Lake ports, and $4,119 to Baltimore.

WHALEBONE.

Unmanufactured whalebone entered into consumption to the amount of 1,880 pounds, valued at $1,379. The consumption of manufactured whalebone is valued at $851.

SHELL.

Shells of every description, including, doubtless, both tortoise shell and shells of mollusks, entered into consumption, $162,768.76.

CORAL.

Unmanufactured coral entered into consumption to the amount of $718.14; coral cut or unmanufactured to the amount of $28,649.

LEATHER.

The following table shows the amounts and values of leather and leather articles entered into consumption:

Hides and skins:	
Goat-skins, Angora, and sheep-skins, with the wool on (less the value of the wool)	$7,419 15
Goat-skins, raw	3,181,072 40
All other hides, raw or uncured, whether dry, salted, or pickled; and skins, except sheep-skins, with the wool on	11,795,029 93
Leather, tanned, not manufactured	4,588,491 46
Manufactures of leather	3,449,979 76
Parchment	8,938 00
Preparations of viscera:	
Manufactures of bladders	106 00
Gold-beaters' molds and skins:	
Entered into consumption	14,236 00
Imported (this whole import comes to New York)	13,634 00
Sinews, nerves, &c., crude	3,798 00
Catgut and whipgut unmanufactured, catgut strings and gut-cord for musical instruments, also gut and wormgut for whip and other cords, entered into consumption	163,109 39

The total entry of catgut strings amounts to $146,210. Of this, New York receives $117,952, Baltimore $12,218, San Francisco $5,635, Boston $5,411, New Orleans $2,898, and Philadelphia $1,644.

Wool pelts, less the value of the wool, are imported to the value of $8,736. This import is entered entire at Boston.

HIDES AND SKINS.

The following shows the value of importations of hides and skins:

Argentine Republic	$2,071,161
Austria	26,846
Belgium	513,677
Brazil	1,138,819
Central American States	43,716
Chili	10,921
China	822
France	237,777
French West Indies and French Guiana	3,543
French Possessions in Africa	36,595
All other French Possessions	1,972
Germany	234,153
England	1,988,186
Nova Scotio, New Brunswick, &c	14,303
Quebec, Ontario, &c	493,530
British Columbia	23,288
Newfoundland and Labrador	2,327
British West Indies and Honduras	17,577
British Guiana	808
British East Indies	1,272,617
British Possessions in Africa	154,746
British Possessions in Australasia	627
All other	26,364
Hawaii	50,861
Hayti	7,219
Italy	679
Japan	121
Mexico	1,529,702
Netherlands	126,857
Dutch West Indies and Dutch Guiana	93,778
Portugal	23,467
Azores, Madeira, and Cape Verde Islands	48,122
San Domingo	19,977
Cuba	65,783
Porto Rico	13,826
Spanish Possessions elsewhere	14,679
Turkey in Africa	562
United States of Colombia	1,033,079
Urugnay	1,790,057
Venezuela	703,694
All unnumbered ports in Africa	125,853
	14,963,701

The next table shows the ports at which hides and skins are entered by the importers:

Districts.	Hides and skins, other than furs.	Districts.	Hides and skins, other than furs.
Baltimore, Md	$184,422	Niagara, N. Y	$92,891
Boston and Charlestown, Mass	3,498,204	Oswegatchie, N. Y	80,309
Brazos de Santiago, Tex	607,139	Oswego, N. Y	5,829
Buffalo Creek, N. Y	105,482	Pamlico, N. C	238
Cape Vincent, N. Y	22,623	Paso del Norte, Tex	9,261
Champlain, N. Y	7,129	Pearl River, Miss	471,104
Chicago, Ill	690	Plymouth, Mass	9
Corpus Christi, Tex	157,135	Providence, R. I	778
Detroit, Mich	49,919	Puget Sound, Wash	25,897
Fairfield, Conn	251	Richmond, Va	45
Galveston, Tex	7,359	San Francisco, Cal	26
Gloucester, Mass	80	Savannah, Ga	86,446
Huron, Mich	11,533	Superior, Mich	191
Minnesota, Minn	4,305	Vermont, Vt	68
New Bedford, Mass	20,065	Willamette, Oreg	111,979
Newburyport, Mass	7,337	Wilmington, N. C	1,025
New Haven, Conn	87		
New Orleans, La	66,879	Total	14,963,701
New York, N. Y	9,326,876		

The next table shows the importation of manufactured leather and articles made therefrom:

Countries.	Leather, and manufactures of.				
	Leather of all kinds.		Gloves of kid, and all other of skin or leather.		Other manufactures of.
	Pounds.	Dollars.	Doz. prs.	Dollars.	Dollars.
Austria	36	49	55	220	677
Belgium	5,374	7,007	6,377	41,024	432
Brazil	195	130	.....	.....	104
China	623	422	.....	.....	7,255
Danish West Indies	15	9	.....	.....	15
France	4,633,915	3,005,685	231,093	1,350,022	142,501
Germany	658,708	442,568	258,870	1,126,109	126,119
England	1,199,606	778,065	90,063	543,517	242,549
Scotland	382	255	47	319	722
Ireland	.....	.....	.....	.....	100
Nova Scotia, New Brunswick, &c	.....	.....	2	9	1,088
Quebec, Ontario, &c	583,873	82,854	12	105	10,948
British Columbia	.....	.....	.....	.....	755
British West Indies and British Honduras	.....	.....	.....	.....	5
British East Indies	354,143	176,193	.....	.....	759
British Possessions in Africa, &c	12	15	.....	.....	50
British Possessions in Australasia	480	567	.....	.....	177
Hawaii	.....	.....	.....	.....	7
Hayti	1,821	1,214	.....	.....	.....
Italy	1,963	1,348	310	1,333	119
Japan	.....	.....	.....	.....	406
Mexico	2,785	1,284	16	93	1,242
Netherlands	1,533	1,022	1	11	.....
Azore, Madeira, and Cape Verde Islands	.....	.....	.....	.....	5
Russia on the Baltic and White Seas	400	405	.....	.....	427
Spain	.....	.....	16	97	33
Cuba	424	283	.....	.....	113
Sweden and Norway	60	62	.....	.....	80
Turkey in Africa	.....	.....	.....	.....	3
United States of Columbia	805	162	.....	.....	284
Uruguay	115	12	.....	.....	.....
Venezuela	55	42	.....	.....	31
Total	7,447,423	4,589,713	595,802	3,128,910	537,014

The exports of leather are as follows:

	Quantity.	Value.
Leather of all kinds, not elsewhere specified ..... pounds..	.....	$2,480,427
Morocco and other fine leather	25,122,936	6,010,373
Boots and shoes ..... pairs..	.....	1,280,225
Saddlery and harness and other manufactures	300,484	414,630
	.....	456,073
Total	.....	10,647,728

The foreign exports of hides and skins amount to $44,415. This export is made from New York and Boston to France ($13,976), Nova Scotia and New Brunswick ($12,068), England ($10,668), and Germany ($7,515). That of leather amounts to $106,762 (382,765 pounds), chiefly to England and Canada; of leather gloves $13,372 (2,286 dozen pairs), chiefly to Canada and France; and other manufactures, $17,857, to British Columbia, Scotland, Mexico, England, Canada, and France.

The tables below show the amounts of exports by countries and by districts:

Countries.	Leather, and manufactures of.						
	Boots and shoes.		Leather of all kinds, not elsewhere specified.		Morocco, and other fine.	Saddlery and harness.	Manufactures of, not elsewhere specified.
	Pairs.	Dollars.	Pounds.	Dollars.	Dollars.	Dollars.	Dollars.
Argentine Republic	144	255	850	246	.....	388	1,419
Austria	.....	.....	102,523	40,525	.....	.....	.....
Belgium	.....	.....	1,839,757	560,390	26,813	50	1,113
Brazil	2,938	3,238	.....	.....	.....	394	6,132
Central American States	11,782	16,077	.....	.....	.....	10,136	566
Chili	.....	.....	.....	.....	.....	493	184
China	75	165	19,223	6,744	.....	112	201
Danish West Indies	8,961	9,338	7,926	1,766	45	1,133	3,056
France	.....	.....	64,909	18,140	1,375	1,990	1,455
French West Indies and French Guiana	.....	.....	.....	.....	.....	307	.....
Miquelon, Langley, and St. Pierre Islands	1,357	2,403	4,474	1,079	95	.....	.....
French Possessions in Africa and adjacent islands	192	204	.....	.....	.....	.....	.....
French Possessions, all other	4,103	6,723	1,976	463	.....	576	416
Germany	18,938	25,797	6,120,639	1,515,938	11,138	276	101,601
Great Britain: England	1,153	1,756	15,718,808	3,575,241	1,210,026	573	78,396
Scotland	1,104	4,910	184,751	45,312	3,240	12	39,301
Gibraltar	.....	.....	.....	.....	.....	.....	152
Nova Scotia, New Brunswick, and Prince Edward Island	41,091	48,723	43,402	11,140	5,342	4,009	8,279
Quebec, Ontario, Rupert's Land, and the Northwest Territory	18,074	33,890	91,331	26,356	175	6,911	20,620
British Columbia	17,896	31,294	12,132	3,253	.....	7,599	6,336
Newfoundland and Labrador	240	500	153,261	32,796	1,285	.....	2,501
British West Indies and British Honduras	56,093	66,633	28,399	7,740	2,139	3,316	5,302
British Guiana	370	462	32,416	8,992	1,125	105	692
Hong-Kong	78	179	8,630	2,152	.....	149	977
British Possessions in Africa	472	1,313	5,719	4,430	522	96	1,217
British Possessions in Australasia	398	702	15,973	4,360	7,953	17,685	8,019
Hawaiian Islands	21,188	32,341	9,176	2,428	.....	7,841	5,231
Hayti	12,165	13,670	250	127	688	1,097	453
Italy	.....	.....	3,310	1,100	.....	.....	.....
Japan	638	1,262	325,698	71,953	.....	2,962	7,588
Liberia	2,453	4,584	.....	.....	.....	.....	144
Mexico	38,793	53,383	4,077	1,675	102	4,446	8,010
Netherlands	2,198	2,662	194,291	64,330	2,767	.....	16,766
Dutch West Indies	4,473	4,799	16,668	4,253	20	873	1,824
Peru	546	948	.....	.....	.....	750	993
Portugal	.....	.....	.....	.....	.....	.....	1,007
Azore, Madeira, and Cape Verde Islands	2,231	3,064	2,518	572	498	.....	.....
Russia, Asiatic	1,327	2,642	3,100	800	.....	487	313
San Domingo	7,712	8,962	.....	.....	181	324	1,033
Cuba	3,958	4,785	3,867	1,279	2,075	3,348	19,056
Porto Rico	550	622	280	112	378	1,790	949
Spanish Possessions in Africa and adjacent islands	.....	.....	519	170	.....	.....	264
Sweden and Norway	.....	.....	9,421	2,687	.....	.....	.....
Turkey in Europe	.....	.....	.....	.....	.....	.....	5,268
Turkey in Asia	.....	.....	.....	.....	.....	.....	80
United States of Colombia	15,625	24,914	2,155	608	.....	9,227	2,519
Uruguay	.....	.....	.....	.....	771	.....	.....
Venezuela	424	532	407	123	1,462	4,630	2,255
All other islands and ports, not elsewhere specified	744	898	100	93	.....	.....	.....
Total	300,484	414,630	25,122,936	6,016,373	1,280,225	94,085	361,988
Additions taken from Canadian reports	.....	133,842	.....	.....	.....	.....	380,312
Grand total	.....	548,472	.....	.....	.....	.....	742,300

Districts.	Leather, and manufactures of.						
	Boots and shoes.		Leather of all kinds, not elsewhere specified.		Morocco, and other fine.	Saddlery and harness.	Manufactures of, not elsewhere specified.
	Pairs.	Dollars.	Pounds.	Dollars.	Dollars.	Dollars.	Dollars.
Alaska, Alaska			50	10			
Baltimore, Md	3,599	6,120	516,145	202,137	441	1,530	1,370
Bangor, Me	63	60					
Boston and Charlestown, Mass	25,585	33,433	3,312,403	666,173	1,119,981	5,040	26,821
Brazos de Santiago, Tex	25,823	32,218	125	27		1,233	153
Buffalo Creek, N. Y							2,319
Cape Vincent, N. Y	75	109					1,934
Champlain, N. Y	1,650	1,658	57,566	16,639		234	3,316
Corpus Christi, Tex	8,457	14,976	95	90		550	341
Cuyahoga, Ohio			70	21			215
Detroit, Mich	1,444	3,342				702	4,077
Duluth, Minn							29
Erie, Pa			60	16			
Genesee, N. Y	72	145	905	250		808	
Huron, Mich							662
Key West, Fla						65	
Machias, Me			50	8			44
Minnesota, Minn	3,286	4,708				4,739	
New Bedford, Mass			227	62			
New Haven, Conn							5,268
New London, Conn			280	112		375	56
New Orleans, La	4,288	4,068				170	232
New York, N. Y	129,857	167,856	19,020,309	4,499,578	159,506	44,305	274,390
Niagara, N. Y					175	60	140
Norfolk, Va							144
Oswegatchie, N. Y	3,755	3,013	5,065	1,535			4,628
Oswego, N. Y							32
Passamaquoddy, Me	26,828	30,021				2,418	5,192
Philadelphia, Pa	2,116	2,126	1,736,280	518,679	20	522	689
Portland, Me							895
Puget Sound, Wash	25	87				264	862
Saluria, Tex	3,119	4,279	30	15	102	140	24
San Francisco, Cal	49,515	80,915	445,571	103,103		30,248	24,851
Savannah, Ga	3,135	3,581	40	23			36
Vermont, Vt	7,792	20,915	27,665	7,895		368	3,268
Willamette, Oreg						314	
Total	300,484	414,630	25,122,936	6,016,373	1,280,225	94,085	361,988
Additions to Niagara and Vermont, taken from Canadian reports		133,842					380,312
Grand total		548,472					742,300

HAIR.

The amounts of hair and manufactures of hair entered into consumption are shown in the following table:

Hair, and manufactures of.	Pounds.	Value.
Hair, unmanufactured:		
Human hair, cleaned or drawn		$40,652
Human hair, not cleaned or drawn		41,637
Horse-hair, used for weaving, cleaned or uncleaned, drawn or undrawn	121,588	90,198
Horse-hair, all, and cattle-hair, cleaned or uncleaned, drawn or undrawn, unmanufactured	2,226,602	391,430
Cleaned hair, unmanufactured, not otherwise specified		54,501
Hogs' hair		15,057
Curled hair, other than hogs', for beds or mattresses		16
Hair, manufactured:		
Manufactures of human hair		14,825
Hair-cloth, and other manufactures not otherwise provided for		98,661
Hair bracelets, braids, chains, &c		1,484
Hair-pencils		3
Total		748,413

The imports of hair, by countries, are as shown below:

Countries.	Hair, and manufactures of.		Horse-hair for weaving.		Hair of all other kinds, not manufactured.	
	Hair, human, and manufactures of.	Hair, other, and manufactures of, not elsewhere specified.				
	Dollars.	Dollars.	Pounds.	Dollars.	Pounds.	Dollars.
Argentine Republic	.....	.....	596,741	104,240	144,220	26,380
Belgium	57	335	.....	.....	650	413
Brazil	.....	.....	161,715	33,405	420,960	71,943
China	832	.....	.....	.....	.....	.....
France	18,742	6,574	9,278	7,594	34,903	7,981
Germany	39,741	26,956	59,126	51,338	45,323	20,490
England	13,972	119,442	21,167	17,862	403,786	58,989
Scotland	.....	8,610	.....	.....	.....	.....
Ireland	.....	.....	.....	.....	.....	.....
Nova Scotia, New Brunswick, &c.	.....	.....	1,192	224	12,218	454
Quebec, Ontario, &c.	2,179	.....	.....	.....	10,387	862
Hong-Kong	.....	601	.....	.....	.....	.....
British Possessions in Australasia	.....	37	.....	.....	.....	.....
Italy	1,481	.....	.....	.....	.....	.....
Japan	71	.....	.....	.....	.....	.....
Mexico	.....	.....	3,926	570	178,143	28,741
Cuba	.....	.....	.....	.....	2,067	443
Porto Rico	.....	.....	.....	.....	138	52
Netherlands	.....	.....	.....	.....	6,110	568
United States of Colombia	.....	.....	.....	.....	95	20
Uruguay	.....	.....	.....	.....	235,315	49,112
Turkey in Africa	.....	41	.....	.....	.....	.....
Total	77,075	162,596	853,146	215,239	1,494,324	266,398

The imports are made chiefly to New York, Boston, and Philadelphia. Twenty-one thousand and three pounds of horse-hair for weaving, valued at $4,201, pass through Boston to England as a foreign export; also manufactures of human hair to the value of $19,329, chiefly to England, and other hair manufactures ($3,597) chiefly to Belgium.

BRISTLES.

The amount of bristles entered into consumption is placed at 353,287 pounds, valued at $545,011. The imports of bristles by countries is shown below:

Countries.	Bristles.	
	Pounds.	Dollars.
China	1,871	713
France	43,532	48,064
Germany	193,329	472,149
England	11,324	15,534
Total	450,056	536,460

Almost the entire import of bristles is entered at New York (449,910 pounds), a small quantity going to Boston (137) and New Orleans (9). There is a foreign export of bristles from New York to Canada amounting to 4,642 pounds ($3,236).

QUILLS.

The amount of quills entered into consumption, prepared and unprepared, is valued at $1,051. The value of toothpicks entered into consumption is $15,441.

FEATHERS.

The value of feathers entered into consumption is shown below:

Feathers and down for beds and feather-beds	$12,531 50
Ornamental feathers, ostrich, vulture, cock, &c., crude	634,450 20
Feathers, dressed, colored, or manufactured	15,352 00

The total entries of feathers amount to $11,313, of which New York receives $10,431, and San Francisco $727, with trifling entries at other ports. There are also feather-beds to the value of $1,404, coming chiefly to New York and Philadelphia.

GLUE AND GELATINE.

The import of hide-cuttings for glue-stock amounts in value to $320,722, of which New York receives $163,593, Boston $156,448, and Baltimore $681. Hoofs and other glue-stock of that description are valued at $10,650, of which $10,188 comes to the Lake ports.

The import of common glue amounts to 1,112,527 pounds, valued at $26,345.60.

The consumption of gelatine and similar products, of which a portion is probably of vegetable origin, is valued at $90,971.

Isinglass or fish-glue entered into consumption to the value of $32,236 (75,267 pounds).

The total import of fish sounds and glue is given at $16,125; $11,727 comes to Boston, and $4,398 to other ports.

Glue is exported to the amount of 81,685 pounds, valued at $16,069.

SPONGES.

The total import of sponges is valued at $91,742. New York receives $74,524, Philadelphia $2,452, and San Francisco $1,693.

OILS, FATS, AND SOAPS.

The following quantities entered into consumption:

Oils.	Amount.	Dollars.
Cod-liver oil, brown or crude, from provinces, not dutiable ..... gallons	129,263	81,607 00
dutiable ..... do	13,732	15,434 00
Total	142,995	97,041 00
Cod-liver oil, refined, medicinal		17,290 00
Whale or fish oil from provinces, not dutiable ..... gallons	19,620	10,982 00
dutiable ..... do	26,711	11,237 00
Total	46,331	22,219 00
Neat's-foot, and all animal, not otherwise provided for ..... gallons	2,597.50	1,124 93
Seal ..... do	410	80 00
Tallow ..... pounds	25,522	1,938 00
Total		2,142 93

Oils.	Amount.	Dollars.
Spermaceti and wax ..... pounds..	16,371	6,302 00
Stearine ..... do....	595	159 00
Tallow, and all other, and tapers ..... do....	1,231	253 00
Glycerine ..... do....	1,936,244	124,923 00
Grease* ..... do....	3,140,074	117,074 22
Soap-grease ..... do....	112,587	5,040 00
Common soap ..... do....	3,791,688	219,089 64
Fancy soap ..... do....	197,818	75,765 45

* The total import of grease amounts to $116,070; New York receives $58,340, Boston, $56,057.

Soap-grease is imported to the value of $5,384. Boston receives $2,384, New York $1,469, the Lake ports $894, and Philadelphia $637.

The total import of sperm oil is $5,590, all coming to San Francisco.

The next table shows the exports of oils and fats:

Oils, fats, &c.	Amounts.	Dollars.
Whale and other fish oil ..... gallons..	1,026,038	442,105
Sperm oil ..... do....	634,991	879,865
Spermaceti ..... pounds..	153,552	41,027
Neat's-foot and other animal oils ..... gallons..	19,932	19,720
Lard oil ..... do....	349,429	284,551
Tallow ..... pounds..	91,472,803	7,883,616
Soap ..... do....	1,616,163	253,634
Tallow candles ..... do....	.....	638,952
Total	.....	10,820,530

There is a foreign export of whale and other fish oils, apparently from the British Provinces through Boston to Belgium; this amounts to 43,103 gallons, valued at $26,669. A small foreign export of dutiable oils of this description goes to Quebec, Ontario, &c. (1,459 gallons), the British West Indies (236), and Brazil (10). This whole export amounts to 1,705 gallons, valued at $794. It passes through Boston (1,365 gallons) and New York (340).

The imports of whale and fish oil by countries and by districts are shown below:

Countries.	Whale oil and fish oil, not of American fisheries.	
	Gallons.	Dollars.
FREE.		
Nova Scotia, New Brunswick, &c	130,562	79,403
Quebec, Ontario, &c	2,142	1,339
Newfoundland and Labrador	6,004	3,346
Total	138,708	84,088
DUTIABLE.		
Danish West Indies	2,745	2,814
Germany	4,128	3,672
England	11,164	21,604
British Columbia	10,945	4,447
Newfoundland and Labrador	450	161
British West Indies and British Honduras	2,554	837
Hawaii	2,609	1,070
Netherlands	4,767	5,377
Asiatic Russia	12,400	3,941
Sweden and Norway	120	93
Total	51,882	44,015

Districts.	FREE.		DUTIABLE.	
	Whale and fish, not of American fisheries.		Whale and fish, not of American fisheries.	
	Gallons.	Dollars.	Gallons.	Dollars.
Boston and Charlestown, Mass	82,007	45,782	2,570	771
Champlain, N. Y	72	97	.....	.....
Gloucester, Mass	1,360	593	.....	.....
Huron, Mich	2,070	1,242	.....	.....
New York, N. Y	40,680	31,870	23,238	33,694
Passamaquoddy, Me	10,160	3,480	.....	.....
Philadelphia, Pa	.....	.....	120	92
Portland and Falmouth, Me	2,090	895	.....	.....
Puget Sound, Wash	.....	.....	4,535	1,851
Salem and Beverly, Mass	269	129	.....	.....
San Francisco, Cal	.....	.....	18,821	6,482
Willamette, Oreg	.....	.....	2,598	1,124
Total	138,708	84,088	51,882	44,015

PERFUMERY MATERIALS.

The next table shows the quantity entered into consumption of materials used by perfumers:

Description.	Ounces.	Dollars.
Castor or castoreum	.....	3,482
Civet	.....	1,218
Civet and musk in natural pod	5,991	33,336
Ambergris	.....	694
Total	.....	38,710

COLORING MATERIALS.

The next table shows the quantity entered into consumption of substances used by color-makers:

Description.	Pounds.	Dollars.
Cochineal	1,304,370	648,621
Lac, crude, seed, button, and stick	47,063	9,592
Lac-dye	454,781	26,243
Total	.....	674,456

The total import of cochineal is 1,324,165 pounds, valued at $649,325.

The next table shows the quantity of cochineal imported, by countries:

Imports of cochineal.

Countries.	Pounds.	Dollars.
Belgium	19,881	9,867
Central American States	13,115	5,296
France	11,316	7,065
England	342,109	180,035
British West Indies and British Honduras	11,219	6,500
Australasia, British Possessions	972	467
Mexico	111,763	52,466
Spanish Possessions in Africa	314,290	174,394
United States of Colombia	499,500	213,235
Total	1,324,165	649,325

The next table shows the quantity of imports by customs districts:

Districts.	Pounds.	Dollars.
New York	919,870	431,063
New Haven	284,133	157,345
Boston	60,157	31,303
Philadelphia	45,918	21,851
San Francisco	14,087	5,763
Total	1,324,165	649,325

In addition to the above, we find that 66,986 pounds, valued at $52,938, pass through New York to England (foreign exports).

WAX.

The next table shows the quantity entered into consumption of wax and manufactures thereof.

Description.	Amount.	Dollars.
Wax, and manufactures of:		
Bees-wax ..... pounds..	19,687	3,198
Sealing-wax	.....	3,088
Manufactures of, not otherwise provided for	.....	6,356
Total	.....	12,553

The total import of wax amounts to $16,844, of which New York receives $11,764 and Philadelphia $3,330.

The total export of wax amounts to 276,891 pounds, valued at $22,876.

The total export of bone-black, ivory-black, and lamp-black (the latter not of animal origin), amounts to 515,488 pounds, valued at $22,876.

CHEMICAL PREPARATIONS, MEDICINES, ETC.

The following table shows amounts entered into consumption:

Articles.	Pounds.	Dollars.
Phosphorus	56,474	11,295
Ammonia (crude)	1,341	131
Sugar of milk	.....	14,653
Albumen and lactarine	.....	57,965
Animal carbon	.....	396
Cuttle-fish bone	54,215	9,483
Cantharides	14,206	11,843
Rennets, raw and prepared	.....	12,016
Total value	.....	117,801

The total import of rennets is valued at $11,944, of which New York receives $11,470 and San Francisco $398.

BONES.

The value of the import entries of "bones, crude, and not manufactured, burned, calcined, ground, or steamed, and bone-dust and bone-ash for

the manufacture of fertilizers," is placed at $82,882. The amount entered into consumption is $56,935.

The principal import is through the Lake ports, which enter to the value of $52,469. Baltimore, the seat of many extensive fertilizer factories, receives to the value of $23,857, New York $4,937, and Boston $1,475.

The total export of bones and bone-dust amounts to 7,072,000 pounds, valued at $121,493.

GUANO AND OTHER FERTILIZERS.

The import entry of guano, except from bonded islands, is placed at 25,482 tons, valued at $873,790.

The export of guano amounts to 954 tons, valued at $41,530. 2,757 tons, valued at $77,190, goes as a foreign export to Ireland (1,537 tons), England (680), and Cuba (535). It passes through Petersburg, Va. (1,437 tons), Beaufort, S. C. (779), and New York (541).

Other fertilizers are imported to the value of $157,471. Of this amount Baltimore receives $48,230, New York $18,897, Philadelphia $9,613, and other ports $80,647.

Manures, probably mostly animal, are exported, to the value of $1,076,602.

SPECIMENS OF NATURAL HISTORY.

The following entered into consumption:

Specimens of natural history, botany, and mineralogy for cabinets, &c., and not for sale	$12,191
Skeletons and other preparations of anatomy	4,040
Bird-skins	11
Stuffed birds	1,097
Fossils	375
Total	17,714

The following table shows the countries from which guano is imported:

Countries.	Guano (except from bonded islands).		Countries.	Guano (except from bonded islands).	
	Tons.	Dollars.		Tons.	Dollars.
Chili	1,832	55,139	Mexico	18,481	741,124
France	16	790	Venezuela	4,463	65,276
Scotland	4	317	All other countries and ports in South America	1	12
British West Indies and British Honduras	615	7,123			
Hayti	100	3,178	Total	25,582	873,390
Peru	70	143			

Guano is brought chiefly to New York (16,738 tons), Baltimore (7,732), Philadelphia (673), Norfolk (300), San Francisco (122), and New Orleans (16).

The two following tables show the aggregate imports and exports for the years 1875, 1876, and 1877.

Net imports.

Articles.	1875.	1876.	1877.
Living animals	$2,062,542	$1,715,264	$1,625,495
Fish	2,802,395	2,520,238	2,253,620
Hides, skins, furs undressed, hair, &c	20,541,768	15,185,194	16,840,299
Furs	2,987,865	2,881,329	2,348,380
Wool, unmanufactured	10,379,438	7,929,139	6,684,425
manufactures of	44,216,371	32,607,152	25,328,169
Silk, raw	4,471,396	5,405,608	6,583,228
manufactures of	24,107,665	23,487,418	21,630,566
Leather and manufactures of	10,166,909	8,208,150	8,117,655
Hair manufactures	879,419	348,621	216,745
Oils, animal and vegetable	1,906,949	1,508,387	1,690,829
Guano	525,667	704,818	796,200
Provisions not included			
	$125,048,384	$102,500,718	$94,124,611

Net exports.

Articles.	1875.	1876.	1877.
Living animals	$2,672,505	$2,436,287	$3,325,203
Provisions:			
Meats	39,217,176	49,502,834	67,288,758
Butter and cheese	15,166,599	13,379,579	17,125,243
Eggs and condensed milk	132,308	126,849	132,230
Fish	3,165,065	3,715,184	4,139,706
Hides, skins, furs, and hair	9,555,747	7,615,565	6,607,716
Wool, unmanufactured	62,754	13,845	26,446
manufactures of (not including hats and caps)	154,401	336,389	291,837
Leather and manufactures of (including trunks)	7,438,192	10,142,576	8,298,383
Oils and fats:			
Animal oils, including whale oil	1,420,324	1,975,972	1,623,301
Lard	22,900,522	22,429,485	25,562,665
Tallow	5,692,203	6,734,378	7,883,616
Soap (and starch)	1,136,178	1,209,695	1,093,234
Manures	616,376	922,221	1,118,132
Total	$109,330,345	$120,630,859	$144,516,470
Annual average for three years			

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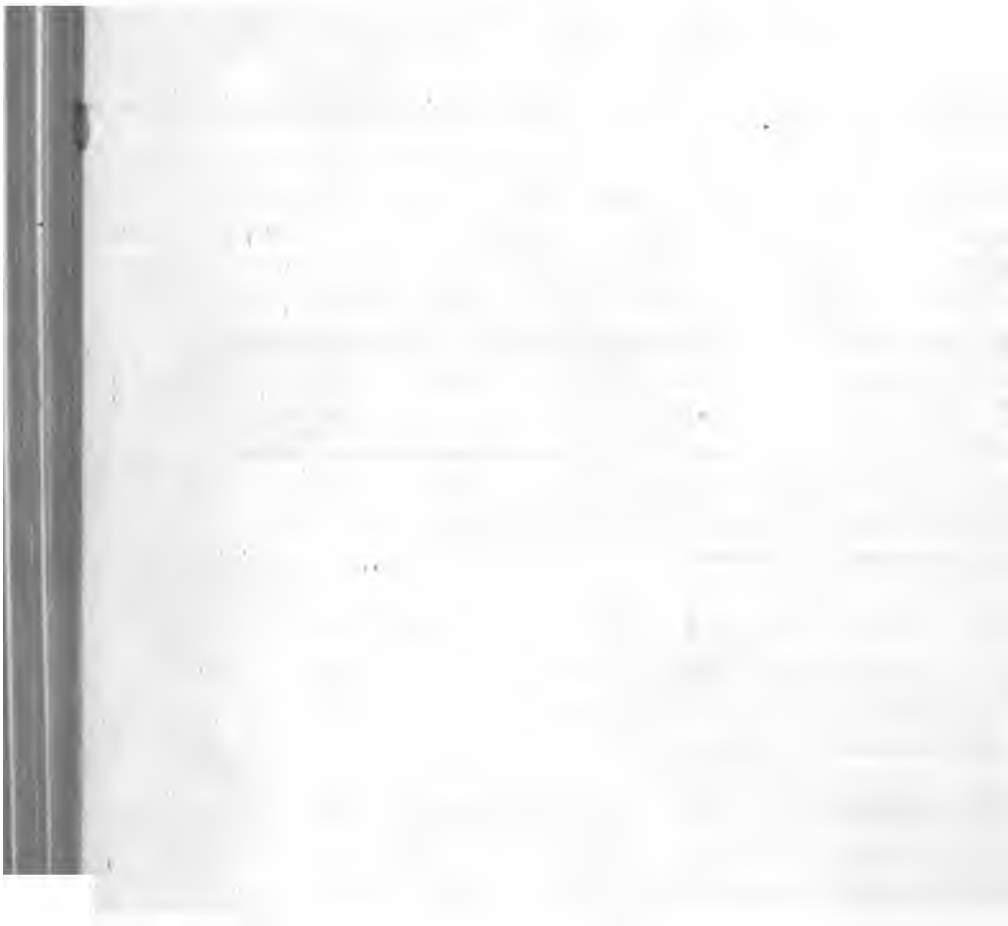

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UNITED STATES NATIONAL MUSEUM.

No. 15.

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ADVERTISEMENT.

This work is the fifteenth of a series of papers intended to illustrate the collections of Natural History and Ethnology belonging to the United States, and constituting the National Museum, of which the Smithsonian Institution was placed in charge by the act of Congress of August 10, 1846.

It has been prepared at the request of the Institution, and printed by authority of the honorable Secretary of the Interior.

SPENCER F. BAIRD,
Secretary of the Smithsonian Institution.

SMITHSONIAN INSTITUTION,
Washington, April 15, 1879.

CONTRIBUTIONS

TO THE

NATURAL HISTORY

OF

ARCTIC AMERICA,

MADE IN CONNECTION WITH

THE HOWGATE POLAR EXPEDITION, 1877-78,

BY

LUDWIG KUMLIEN,

NATURALIST OF THE EXPEDITION.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1879.

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INTRODUCTION.

By Ludwig Kumlien.

The vessel conveying the Howgate preliminary Polar Expedition was the "Florence" of New London, Conn. She is a fore-and-aft schooner of fifty-six tons, and was built in Wells, Me., in 1851, for mackerel, and was subsequently used as a sealer in the southern seas.

Although a staunch and fair sea-boat, as far as her diminutive dimensions could allow, a less suitable vessel for the purpose could hardly have been chosen. To say that she was *too* small for thorough scientific work covers the ground, but quite fails to convey a proper idea of what drawbacks all scientific labors were subjected to on this account.

The schooner was fitted out in New London, and sailed on the morning of August 3, 1877, unfortunately at least two months later than desirable, had her object been purely scientific.

The primary object of the expedition, by Captain Howgate's order, was to collect material, skins, skin clothing, dogs, sledges, and Eskimo, for the use of a future colony on the shores of Lady Franklin Bay. The secondary object of the expedition was scientific work; and, thirdly, whaling was to be one feature of the cruise.

So far as the primary object is concerned, the expedition was as successful as could be expected: a large amount of skins was collected and made into clothing; the services of sixteen Eskimo were secured, who were willing to accompany the coming steamer northward; nearly thirty dogs were secured, and several good sledges, with an ample supply of whales' jaw-bones for shoeing the runners for some years.

As has been stated by Captain Howgate, "the peculiar nature of her mission lifted the enterprise from the level of an ordinary whaling voyage to the higher plane of geographical discovery." Every one, except the scientists, had a "lay" in the voyage; and, so far as the crew was concerned, their "lay" was to be their only remuneration; as a natural consequence, whaling became the primary object to them. The expedition was also fairly successful in this direction.

As far as the scientific work is concerned, some valuable work was

done, especially by Mr. Sherman in meteorology; still, nearly all the scientific labors were prosecuted under very discouraging conditions. The lack of any place to work in save a snow-hut on shore, in which neither sufficient light nor heat was to be obtained, rendered it very difficult to prosecute certain investigations. The late date of sailing and the early departure from the winter harbor deprived us of the most interesting and profitable season for scientific research.

The outward trip presented nothing to break the usual monotony of a long sailing voyage: fogs and light winds prevailed till off the north of Resolution Island, when a strong northeast gale was encountered. The schooner was heavily loaded and poorly trimmed, so that some uneasiness for safety was naturally felt, especially as we were close inshore among icebergs and rocks, in a thick fog and on an unknown coast. One boat was stove in and a few barrels of provisions washed from deck; otherwise no damage was done.

The first anchorage was in Niantilic Harbor, on the western shore of Cumberland Sound, September 12, forty-one days after leaving New London. Some natives were secured here, to assist in whaling; and all their worldly possessions, including dogs, sledges, boats, &c., were taken upon the decks, and the schooner weighed anchor and started for the opposite side of the sound. A short stay was made at the Kikkerton Islands, and on the 6th of October the Florence dropped anchor in the little harbor of Annanactook, at about lat. 67° N., long. 68° 50′ W.

Arrangements were at once begun by Mr. Sherman and myself to erect a shelter that would serve for an observatory and general working-place; an eminence on a little rocky islet in the harbor was chosen for this purpose, and our tent raised. Instrument-shelters were erected, and the meteorological work began in earnest.

As soon as the snow became compact enough, we engaged the Eskimo to build a snow-house for us, in which our tent served as a lining.

It was often difficult to get from the ship to the shore on account of the ice or unusually stormy weather.

We improved every opportunity at this late day to secure specimens; but as the ice soon formed over the sound, our endeavors were far from satisfactory, especially as we were unable to procure a boat with any degree of certainty, as they had to be kept in readiness for whaling.

The winter was spent by Mr. Sherman in taking observations; and to judge from the manner in which he assiduously applied himself to his work, night and day, through all weathers and under the most discour-

aging circumstances, the results of his labors cannot fail to be very valuable and do justice to Mr. Sherman's indefatigable perseverance and scholarly attainments. We spent our time in procuring and taking care of specimens, as well as taking our "watch" at the observatory when not too busy with other work.

From our peculiar surroundings and the isolation to which we were necessarily subjected, we lost much of our wonted enthusiasm during the long, dreary winter, and found rest only in continual work.

The spring of 1878 was stormy and backward, and the prevalence of southerly gales kept the ice closely packed about us till the fore part of July. This treacherous condition of the ice, and early departure from the winter harbor, robbed us of any opportunity to prosecute extended researches, except in the immediate vicinity of the harbor; thus the most valuable season was completely lost to us.

The Florence left her winter harbor on the 6th of July, having all the collected material for the future Arctic colony stored in her hold, and sixteen Eskimo and twenty-eight dogs on deck.

In the unnecessary haste of departure many valuable preparations had to be abandoned for want of time to get them aboard, as well as space to store them.

Short stoppages were made at two or three points on the outward passage from the sound, and on the 19th of July we rounded Cape Mercy and took the pack-ice of Davis Straits. It was on this day that the schooner received the bump which afterwards cost us so much trouble and anxiety.

The pack proved to be quite loose, but extensive, and the floes rather small, but the winds were invariably contrary and quite stiff, and the almost impenetrable fog made the navigation dangerous and tedious; we were often obliged to tie up to a floe and await a "lead" in the pack, or the lifting of the murky fog veil.

Godhavn Harbor, Disko Island, Greenland, was reached on the 31st of July. We were all in high spirits in anticipation of news from home, if not the presence of the expected expedition steamer. Of course the double disappointment was sorely felt.

The advent of the expedition was awaited with great anxiety, more especially as no word had been sent us via Denmark, so we naturally concluded the vessel or vessels were belated from some cause; but when three weeks of waiting brought us no news, the anchor was weighed, and the Florence put on a course for Cumberland once more, to return the Eskimo and their effects to their country.

During our sojourn in Godhaven every attention was paid to our comfort by the highly enlightened Danes resident there, and these three short weeks were to us the most enjoyable of the whole cruise. We pursued our scientific labors here as elsewhere when an anchorage was made, but in this case had the misfortune of being on an old and well-worked field.

On the evening of the 22d of August, the Florence left Godhaven and sped on a southerly course, with a fair north wind; this soon veered to ESE. and blew a gale. For four days the schooner lay hove-to under close-reefed storm-sail, while the hatches were battened down over the poor natives in the hold. We were entirely at the mercy of the elements and drifted with the sea. An impenetrable fog, with heavy rain, continued the whole time, and we were drifting among hundreds of icebergs, but luckily did not come in contact with any.

On the 27th *land* was sighted on our starboard quarter, and subsequent observations proved us to be in the mouth of *Exeter Sound!* We had drifted completely across Davis Straits.

On the 31st of August we again anchored at Niantilic, and *most willingly* landed our passengers and all their goods, and enjoyed a few days of *rest*,—rest from the howling of wind and wave and from the far less musical squall of the juvenile Eskimo and the fiendish howls of the dogs. We could also enjoy the luxury of clean and free decks once more, the first time since June.

On the 12th of September willing hands headed the Florence for home, very glad indeed to near the long-wished-for shores of the United States, but little dreaming of the terrible passage we were about to encounter.

We started with a fair free wind, which soon increased to a gale; and as the size of the schooner forbid scudding with more than a whole sail breeze, we were obliged to heave-to for two days. From this time till the 26th, when we made St. John's, Newfoundland, we were in a continual gale nearly the whole time. At the commencement of each storm, and they followed one another in quick succession, we made a fair run for a few hours, and then hove-to till the storm abated.

On the 11th of October, the Florence left St. John's, Newfoundland, for the United States. The passage was one of unusually severe weather: one storm followed an other before the sea could go down, and to add to our misery the schooner sprang a leak on the evening of the 19th, while carrying a good deal of canvas, with stiff free wind and heavy

head sea. We were somewhere off Sable Island at the time, our exact bearings being unknown to us. The pumps were kept manned, and diligent search made for the leak, but without avail. Such a condition of affairs cast a shadow of gloom over the whole company: our provisions gone, ship leaking badly, and not knowing at what moment it might gain on us; the elements in all their fury let loose, so that we were entirely in their power, drifting helplessly at the mercy of raging billows, without knowledge of our position within a hundred miles. On the evening of October 25, Thatcher's Island lights were sighted, and the Florence seemed to have become animated, for with a fair NW. breeze she sped like a thing of life, and before midnight we saw the reflected lights of Boston on the clouds, and the next morning dropped anchor in Provincetown, Mass. Provisions were secured and some slight repairs made.

On the morning of October 30, the Florence lay alongside of the same dock she had left fifteen months before, every man brought back alive and well.

ETHNOLOGY.

FRAGMENTARY NOTES ON THE ESKIMO OF CUMBERLAND SOUND.

By Ludwig Kumlien.

The Cumberland Straits, Sound, Gulf, or Inlet, extends from about lat. 65° N. to lat. 67°+ N. It is the Cumberland Straits of Baffin, its original discoverer at the end of the sixteenth century; the Hogarth Sound of Captain Penny, who rediscovered it in 1839; and the Northumberland Inlet of Captain Wareham in 1841.

During the last quarter century it has often been visited by Scotch and American whalemen, ships frequently wintering on the southwestern shores.

It is at present unknown if it be a sound or gulf; it is generally considered as a gulf, but some Eskimo say that the Kingwah Fjord, one of the arms extending to the NE., opens into a large expanse of water, to them unknown. Icebergs are also sometimes found in this fjord that, from their positions, seem to have come from the northward, and not from the south.

The eastern shore of this sound forms the western boundary of that portion of Cumberland Island which lies between its waters and Davis Straits, and known as the Penny Peninsula.

In about lat. 66° N. the Kingnite Fjord extends from the sound in an ENE. direction, and nearly joins Exeter Sound from Davis Straits; they are separated only by a portage of a few miles. The Cumberland Eskimo make frequent excursions to the eastern shore via these fjords, but seem to have extended their migrations but a short distance northward, finding Cumberland Sound more to their tastes.

The width of Cumberland Sound opposite Niantilic is about thirty miles, possibly its widest part. It is indented by numerous and large fjords, few, if any, of them having been explored; many islands are scattered along both shores, and in some instances form quite considerable groups.

The present Eskimo are few in numbers. We would estimate the entire population, men, women, and children, on both sides of the sound,

from Cape Mercy on the east to Nugumeute on the west, not to exceed four hundred individuals. It is certain that within the last thirty years the mortality has been very great among them; even the whalemen remark an astonishing diminution in their numbers at the present day, as compared with twenty years ago.

Numerous traditions exist among them of the time when they warred with other tribes, and old men, now living, have pointed out to us islands that were once the scene of battles, where the besieged party was starved into submission by their enemies. According to the usual story, the hurling of stones was one of the most effective and common modes of warfare; this was especially the case when one party could get upon a ledge above the other. At the present day they are peaceful and quiet, have no recognized leader, and no desire to fight, even if their numbers would permit of it.

As the story goes, the present population were the victors in those fights, and took possession of the country they now inhabit. Some say they came from the northwest, and found another tribe, which they overcame and drove away. Their stories on this subject vary, and sometimes with this unusually interesting tradition, as well as many others, they get events of a very recent date hopelessly mixed up with the rest; and it is no unusual instance to find that some whaler with a good imagination has supplied and restored lost portions of the narrative, to their entire satisfaction; but these restorations are chiefly remarkable for their utter disregard of truth or possibility.

The following tradition is a translation from one of the most reliable natives we became acquainted with:

"A long time ago (*tichemaniadlo*)* other Innuits (Eskimo) were found here; they were called "Tunak";† they were very strong, very large, and had short legs and large arms; they had very wide chests. Their clothes were made of bear skins, and their knives from walrus tusks. Did not use bows and arrows, but only the harpoon-lance; they harpooned the reindeer in the water, from their kyacks; used very large kyacks. The

* Here arises a great difficulty: *tichemani* signifies a long time, *i. e.*, it may be anywhere from a week to a year; *tichemaniadlo* is a very much longer period, generally conceded to antedate the advent of the whites; at least, this was the only example we could bring up which they could understand, except their own ages, which we could ascertain with less certainty. When a *very* long period (as in this case) is represented as having intervened, they repeat *tichemaniadlo* several times, but how much *time* is added by each repetition we are unable to say.

† Variously pronounced, "Tunare," "Tunnuk," or "Tunnak."

Tunuks made houses out of *stone.** They were able to lift large stones. We were afraid of them; we fought with them and killed them. They (the *Tunuks*) came in the first place from *Greenland.*† The women made clothes from their own hair. They had no dogs at that time, but they made sledges and harnesses, and finally (*witchou* = by and by) put the harnesses on three rocks, one white, one red, and one black; they then called, and when they looked they found the stones had been transformed into dogs. After a time they got plenty dogs; then they went about more. The present Eskimo could not understand their language. They lived to a great age (*E. tukewouk nami* = did not die!). Far to the west some Eskimo lately saw some *Tunuks;* they had bear-skin clothing. In the *Tunuks* land (where?) the *musk ox* (*oming muk*), bear, and seals are abundant. They build walls of stones on the land, and drive the reindeer into ponds, and catch them in kyacks. They have a large, long *callytong* (coat, or jumper jacket) that they fasten down around them on the ice while they are watching a seal's hole; underneath this

* *Vide* sketch of foundation, No. 1. Stone foundations of a somewhat peculiar pattern are found in many of the larger fjords. The subject of the sketch was about fourteen feet in its greatest diameter (the larger enclosure) inside; the smaller one about ten feet. The arrangement is much the same as the Eskimo use at the present day, a raised platform in the end opposite the entrance for a sleeping and general lounging place, and two smaller platforms on either side, where the lamps are kept, and where the garbage accumulates.

These foundations are now mere ruins. Some of the stones in the walls are so large that it must have required the united efforts of several men to place them in position. The stones gradually diminish in size from the foundation upward. Standing walls are from two to three feet high, and might have been a foot higher, to judge from the loose stones lying about. There was probably a frame-work of whale ribs, over which the seal-skin covering was spread.

On the north side of this foundation were seven kyacks, built of small stones; they lie parallel to each other, and are from ten to fifteen feet in length; they are built of a single row of stones, and only one tier high. These are said to indicate the number of inmates that have died. They appear to us more like the work of children. In the lamp-places we found the remains of *Pagomys fœtidus* (abundant), *Phoca barbata, Cistophora cristata, Trichechus rosmarus, Ursus maritimus* (the three last-named species occur now only as stragglers in the vicinity), *Rangifer tarandus, Beluga catodon, Larus* ———?, and *Somateria* ———? (*mollissima*, probably). Other bones are found, but not recognizable from decay. No implements were found except a stone skin-scraper. The present Eskimo say these stone foundations were made by the *Tunuks.* They are found in various out-of-the-way places, especially in the greater Kingwah Fjord.

† About twenty years ago, a man and women (Greenlanders) landed near Cape Mercy, having got adrift on a piece of ice on the Greenland coast. From this occurrence we conjecture that the story has received a modern addition.

garment, on the ice, they place a lamp; over this lamp they cook meat. Their eyes are sore all the time. We are afraid of them; do not like them; glad they have gone away."

This tradition differs somewhat in the particulars when told by different individuals, but the main points are essentially the same. Many will not tell it all; some, only parts of it. The ridiculous story about the dogs is firmly believed by the present Eskimo as the origin of these animals.

That the *Tunuks* have been seen of late years in the west is not improbable,—that is, natives, different in dress and stature; but they were most likely the tribe known as the Pelly Bay Eskimo from the north shores of Hudson's Straits and from Fox Channel, they being larger and more robust than the Cumberland Eskimo of the present day. It is certain that since the whalers have begun coming among the Cumberland Eskimo, and introduced venereal diseases, they have deteriorated very much. They now almost depend upon ships coming, and as a consequence are becoming less expert hunters, and more careless in the construction of their habitations, which are merely rude temporary shelters made at a few minutes' notice. Great suffering often ensues from living in these miserable huts. The seal skin that should have gone to repair the tent is bartered to the whalemen for a little tobacco, or some valueless trinket, which is soon thrown aside. The men are employed to catch whales, when they should be hunting in order to supply the wants of their families; and the women, half clad, but sporting a gaudy calico gown, instead of their comfortable skin clothes, and dying of a quick consumption in consequence, when they should be repairing garments or preparing skins, are loafing around the ships, doing nothing for themselves or any one else.

The Cumberland Eskimo of to-day, with his breech-loading rifle, steel knives, cotton jacket, and all the various trinkets he succeeds in procuring from the ships, is worse clad, lives poorer, and gets less to eat than did his forefathers, who had never seen or heard of a white man.

There is a practice among them that is probably of long standing, and is regularly carried out every season, of going into the interior or up some of the large fjords after reindeer. They generally go during the months of July and August, returning in September, to be on hand when the fall whaling begins. The purpose of this reindeer hunt is to procure skins for their winter clothing. Nearly all return to the sound to winter. They have regular settlements, which are hardly ever entirely deserted

at any season. The principal ones are known as Nugumeute, Niantilic, Newboyant, Kemesuit, Annanactook, Oosooadluin, Ejujuajuin, Kikkerton, and Middliejuacktuack Islands, and Shaumeer, situate at different points on both sides of Cumberland Sound. During the winter they congregate at these points in little villages of snow-huts.

The present principal headquarters are at the Kikkerton Islands, or at Niantilic, according to which point the whalers winter. The old harbor of Kemasuit, once the winter harbor of whalers and a favorite resort of the Eskimo, is now deserted, except by a few superannuated couples, who manage to catch enough seal to live on.

As a rule, the present race is of short stature, the men from five feet three inches to five feet six. There are some exceptions, but they are in favor of a less rather than a greater height. The women are a little shorter. The lower extremities are rather short in proportion to the body, and bow-legs are almost the rule. This probably arises from the manner in which the children are carried in the mother's hood, as well as the early age at which they attempt to walk. The habit of sitting cross-legged may also have a tendency to produce this deformity. Their hands and feet are small and well formed. Their hands are almost covered with the scars of cuts and bruises. It seems that in healing the injured part rises, and is always afterwards disgustingly prominent. There is a great variation in the color of their skin, and a description that would answer for one might not apply at all to another. Even among those that are of pure breed there are some whose skins are no darker than a white man's would be if subjected to the rigors of wind and cold, and the never-removed accumulation of soot and grease. Others again seem to have been "born so." The children, when young, are quite fair. The eyes are small, oblique, and black or very dark brown. The hair is black, straight, coarse, and very abundant. It is rarely wavy or curly among the full-blooded Innuits.

There are, of course, exceptions to the above in cases of half-breeds. Their faces are broad and flat, with rather large lips and prominent cheek-bones.

Infanticide is not practiced among the Cumberland Eskimo at the present day. I have learned from some of the most intelligent that this barbarous custom was in vogue in former times, however. Among the natives of Repulse Bay and those living on the north shores of Hudson's Straits, it is practiced to a considerable extent, especially with the tribe known as the Pelly Bay natives. The practice is confined almost en-

tirely to female children, the reason being, they tell us, that they are unable to hunt, and consequently of little account. It seems to have been referable to the same cause among the Cumberland Eskimo. Their intercourse with the whites seems to have modified some of the most barbarous of their primitive habits.

Twins are not common, and triplets very rare. The males outnumber the females. Infanticide may, to some extent, be the cause; but lung diseases, which are alarmingly prevalent, seem more fatal to the women than to the men.

Children are often mated by the parents while they are still mere infants. There is such an extreme laxity of morals that the young women almost invarialy become wives only a short time before they are mothers.

It is impossible to say at what age the women cease to bear children, as they have no idea of their own age, and few are able to count above ten. Puberty takes place at an early age, possibly at fourteen with the female. They are not a prolific race, and it is seldom a woman has more than two or three children, and often only one, of her own; still many, or almost all, have children; but inquiry will generally divulge the fact that some of the children have been bought. Almost every young woman has or has had a child, but the identity of the father is in no wise necessary in order to insure the respectability of the mother or child. Such children are generally traded or given away to some elderly couple as soon as they are old enough to leave the mother. The foster-parents take quite as good care of such adopted children as if they were their own.

So far as we could learn, they do not generally practice any rites or ceremonies of marriage. The best hunter, or the owner of the largest number of dogs and hunting-gear, will seldom have any difficulty in procuring the woman of his choice for a wife, even though she has a husband at the time. It is a common practice to trade wives for short periods or for good. They appear to have marriage rites sometimes, but we could induce no one to tell us, except one squaw, who agreed to, but only on condition that we became one of the interested parties and she the other. This was more than we had bargained for, and, although generally willing to be a martyr for the cause of science, we allowed this opportunity to pass without improving it.

Monogamy is at the present time the most prevalent. Polygamy is practiced only in the case of a man being able to provide for two or more wives. Three, and even four, are known of, but rare. Neither do two

or three wives in one hut make an altogether harmonious household; but all little difficulties are generally settled by the husband, in a manner better calculated to insure reverence to masculine strength than respect for superior intelligence.

The scarcity of women at present in proportion to the men makes polygamy a luxury only to be indulged in by the wealthy. Divorce, if it can be called by that name, is very frequent among them. All that is needed is that the husband tires of his wife, or knows of a better one that he is able to procure. Neither does it seem to trouble the woman much: she is quite sure to have another offer before long; and a change of this kind seems to benefit both parties. One rather remarkable and very laudable practice among these people is the adoption of young children whose parents are dead, or, as often happens, whose mother is the only recognized parent. Orphans, so to speak, are thus twice as common as among civilized nations. These children, whether bought or received as a gift, are always taken as good care of as if they were their own, especially if they are boys.

Among the Eskimo employed by the Florence was a family that had two children, who passed for brother and sister. One, the boy, was a nephew of "Eskimo Joe," of Polaris fame. He had been bought from the Hudson's Straits Eskimo, some two hundred miles to the south. He was a perfect little satan; and, though he gave us much annoyance, he was a never-failing source of amusement to us all. The girl, again, was a native of Exeter Sound, on the west coast of Davis Staits; still, both were considered as their own children, and well cared for.

Half-breeds are said to be of more irritable temperaments, and less able to bear exposure and fatigue, than the full-blooded Eskimo.

The food of the Cumberland Eskimo consists entirely of flesh, and in most sections of the sound of *Pagomys fœtidus*. In fact, this animal is their principal dependence for food, fuel, clothing, and light. The Eskimo will eat a few of the berries of *Vaccinium uliginosum* and *Empetrum nigrum*, the roots of *Pedicularis*, and occasionally a little *Fucus vesiculosus* in winter, but this constitutes a very small and unimportant part of their food.

As soon as the ice has fairly left the sound, the Eskimo hunter leaves the winter encampment, with his family and such portions of his household goods as will be needed, and takes a tour inland or up some of the large fjords after reindeer. The larger part of his possessions, including sledge, dogs, harnesses, winter clothing, &c., he secretes among the rocks in some unfrequented spot. His dogs are put on some little rocky islet,

to shift for themselves. They eke out a scanty subsistence by making good use of their time at low tide, *Cottus scorpius* constituting the greater part of their food at this season.

There are at present so many whaleboats owned by these Eskimo, that they experience little difficulty in making quite extensive cruises, three or four families constituting a boat's crew. They will load a whaleboat to within an inch or two of the gunwale, and then set out for a few weeks of enjoyment and abundance. The squaws do the rowing and the "captain" stands majestically in the stern with the steering oar, while the rest of the men are either asleep or on the lookout for game. The cargo consists of their tent-poles, the skin-tents, pots, and lamps, with sundry skin-bags containing the women's sewing and skinning utensils. Their hunting-gear, of course, forms a quite conspicuous portion of the contents of the boat. Very few there are at present who have not become the possessors of a half-barrel, and this vessel occupies a conspicuous place in the boat, and is almost constantly receiving additions of animal matter in some shape; a few young eiders or gulls will soon be covered up with the intestines of a seal and its flesh. From this receptacle all obtain a piece of meat whenever they feel hungry. This vessel is never emptied of its contents, except by accident or when scarcity of material forbids its repletion; and, as the temperature at this season is well up in the "sixties" during the day, this garbage heap becomes so offensive as to be unbearable to any one but an Eskimo.

They proceed at a very leisurely rate, rowing for a few minutes and then stopping for a time, chatting, smoking, or eating. When they feel tired they haul up on the rocks and have a sleep, and then resume the journey in the same vagabond manner. If, while thus cruising, any live creature that they think there is any possibility they can capture comes in sight, all hands become animated, the oars are plied with redoubled energy, guns and spears are in readiness, and every one is eager for the sport. Hours are often consumed in chasing half-grown duck or young loon, which when procured is but a bite; but the fun of the chase seems to be the principal object, and they enjoy it hugely. Thus they journey till they reach some suitable locality, when the boat is unloaded, the toopiks raised, the lamps put in their places, and all is ready for a grand hunt. The men divide and scatter over the mountains, leaving the camp in charge of the women and children; these busy themselves by hunting for and destroying every living creature that they can find.

On the return of the hunters, who perchance have brought some skins and a hunk of venison, there are joyous times in camp; the meat is dis-

posed of first, and then the younger people engage in various games, while the older ones gather around some aged crone, who excitedly recounts the hunts of her girlhood days, plentifully intermixing stray portions of the old sagas and legends with which her memory is replete. Thus they live from day to day, the men hunting and the women stretching the skins, till the season comes around when they must return to the coast. Happy, contented, vagabond race! no thoughts of the morrow disturb the tranquillity of their minds.

When a deer is killed any distance from camp, the meat is cached, with the intention of returning after it in winter; but with what the wolves and foxes devour and what the Eskimo never can find again, very little is brought back.

Many have now firearms of some pattern or other; and though they will hunt for a ball that has missed its mark for half a day, they do not hesitate to fire at any useless creature that comes in their way. Those that have no guns use bows and arrows made from reindeer antlers. Sometimes the deer are driven into ponds, and even into the salt water, and captured in kyacks with harpoons.

They have an interesting custom or superstition, namely, the killing of the *evil spirit* of the deer; some time during the winter or early in spring, at any rate before they can go deer-hunting, they congregate together and dispose of this imaginary evil. The chief *ancoot, angekok*, or medicine-man, is the main performer. He goes through a number of gyrations and contortions, constantly hallooing and calling, till suddenly the imaginary deer is among them. Now begins a lively time. Every one is screaming, running, jumping, spearing, and stabbing at the imaginary deer, till one would think a whole mad-house was let loose. Often this deer proves very agile, and must be hard to kill, for I have known them to keep this performance up for days; in fact, till they were completely exhausted.

During one of these performances an old man speared the deer, another knocked out an eye, a third stabbed him, and so on till he was dead. Those who are able or fortunate enough to inflict some injury on this bad deer, especially he who inflicts the death-blow, is considered extremely lucky, as he will have no difficulty in procuring as many deer as he wants, for there is no longer an evil spirit to turn his bullets or arrows from their course.

They seldom kill a deer after the regular hunting season is over, till this performance has been gone through with, even though a very good opportunity presents itself.

Salmo salar, and one other species of *Salmo* that I could not procure enough of to identify, are caught to some extent in June and September in some of the larger fjords; they are mostly caught with a spear, but sometimes with a hook. (For description *vide* under hunting-gear, &c.)

When these fish are caught, they are put into a seal-skin bag, and it remains tied up till the whole becomes a mass of putrid and fermenting fish, about as repulsive to taste, sight, and smell as can be imagined. *Cottus scorpius*, which contributes so largely towards the Greenlander's larder, is not utilized by the Cumberland Eskimo, except in cases of a scarcity of other food supplies; the fish is abundant in their waters, however, and fully as good eating as they are on the Greenland coast.

Birds and their eggs also contribute towards their sustenance in season; they are extremely fond of eggs, and devour them in astonishing quantities.

The "black skin" of the whale, called by them *muktuk*, is esteemed the greatest delicacy. When they first procure a supply of this food, they almost invariably eat themselves sick, especially the children. We found this black skin not unpleasant tasting when boiled and then pickled in strong vinegar and eaten cold; but the first attempts at masticating it will remind one of chewing India rubber. When eaten to excess, especially when raw, it acts as a powerful laxative. It is generally eaten with about half an inch of blubber adhering.

The greater portion of their food is eaten raw, especially in winter. When they cook at all, they only "simmer" it over their lamps in a pot of soapstone. These pots are from eight to twenty inches in length, usually about sixteen inches, and though of variable patterns, the length is generally three times the width or depth. Among such Eskimo as are able to procure old cast-away meat-cans from around the ships, tin has superseded the soapstone both for lamps and boiling-pots.

In summer, especially when on hunting excursions, they very often "fry" meat by making a little fireplace of stones, and laying a flat piece of stone on the top. The opening to receive the fuel supply is to windward. For fuel at such times they use *Cassiope tetragona* and *Ledum palustre;* these shrubs make a quick and very hot fire. It would be comparatively an easy task for these people to gather enough *Cassiope tetragona* during the summer to burn during the coldest weather, and not rely wholly upon blubber.

When the Eskimo have been simmering meat, especially seal, in their boiling-pots, they pour off the liquor and mix it with about an equal

quantity of blood; this makes a thick and rather greasy soup that must be quite nourishing; the children are very fond of it. It seems possible that from this dish has originated the popular error that these people *drink oil*, a notion that is simply preposterous.

I found among some of these people a little spoon, or rather a miniature scoop, made of ivory, which they used to drink the soup with; it appears to be an old utensil, now fast going out of use, for they can now procure tin mugs. A reindeer's rib, pointed at one end, is used to fish up the meat with, and sometimes to convey it to the mouth. These instruments are found in the graves, but seem to be but little used at the present day.

When a seal is brought to the encampment, especially if they have not been plenty for some days, all the villagers are invited to the hut of the lucky hunter, and the seal is soon dispatched. A couple of the younger men skin the animal and distribute the pieces to the assembled company as fast as needed. The testicles, being considered as the choicest titbit, are usually handed over to the hostess; the spinal cord is also rated as one of the choicest portions of the animal. During these feasts they gorge themselves to their utmost capacity, and are in good humor and hilarious. Though there may be ever so poor prospects to procure more food for the morrow, this does not deter them from gluttonously devouring the last morsel, and then go on allowance till they can get a fresh supply. I have seen them thus gorge themselves, and then lie down to sleep with a piece of seal meat by their side, which they attacked every time they awoke.

The intestines of birds, notably *Lagopus* and *Somateria*, are looked upon as choice parts, and birds brought to the encampment are generally "drawn" by the hunters. The fatty excrescence at the base of the upper mandible of the male *Som. spectabilis* is too great a temptation for them. It was with great difficulty that we could induce them to bring these birds to camp without having them thus mutilated.

Since whalers began to cruise in the Cumberland waters, they have found that it is decidedly to their advantage to hire boats' crews of natives to assist in the capture of whales. They make good whalemen. When such crews are secured, they wisely count in all of their family in the bargain, so that to secure the services of a crew of seven men one must feed thirty or more. While working for whalers, these Eskimo depend almost wholly on the ship for their food supply; as a consequence, they are fast becoming poor hunters, and prefer to lounge around a vessel

and pick up such scraps as offer themselves rather than to strike out for themselves and live independently and in comparative plenty.

As to meals, or regular meal-times, they eat when hungry, if they have anything. They always eat in the morning before going out to hunt; but the principal meal is in the evening, on their return. When supplied with rations by the ships, they often have their regular meals aboard; but this does in no wise hinder them from taking their usual evening allowance of raw meat when they return to their huts.

That the Eskimo possess considerable powers of abstinence cannot be disputed; but it is not so remarkable after all, for they certainly have had ample experience in this direction. That they are able to bear temporary or sustained exertion better than the whites is doubtful. They are acclimated and have clothing suited to the climate, and readily adapt themselves to the rude shelter of a snow-bank, if necessary; but give a healthy white man as good clothes, and he will stand as much fatigue, and perhaps more.

While hunting with the Eskimo, we often had our nose and face frozen, when it did not seem to affect the Eskimo in the least; but when it came to a tramp through the snow all day long, few of them would stand it any better than we could.

Some have judged their powers of endurance from the manner in which they will follow their game; but it seems to us it is rather their wonderful patience, for we have known them to follow animal tracks for a whole day, when we confess we could not discover the faintest trace of a track, except at long distances apart. They will discover any traces of animals on the snow that a white man would pass by and not notice. When traveling either on the ice or water, they make the journey by short, easy stages, stopping as soon as they feel the least tired, and recruiting; if they were required to walk a given distance, as on a regular march, they would give out.

The Cumberland Eskimo are known to make better and more beautiful clothing than the tribes of Northern Hudson's Bay and Straits. During the summer, and, in fact, at all seasons, except when the weather is very severe, the outer garment of the men is made from the skins of adult—or, more properly speaking, yearlings, as they are the best—*Pagomys fœtidus*. In very cold weather, they betake themselves to deer-skin clothing; but as these clothes are less strong than the seal-skin, they make the change as soon as the weather permits. The women wear the deer-skin clothes much later in the season than the men; their dress

is also made of the same kind of seal, unless they are fortunate enough to procure *Callocephalus vitulinus*, which skins are so highly prized that they use them even though there is only sufficient for a part of the fronts of their jackets.

Both the men and women wear a garment the exact duplicate in shape under the outer one; this garment is made either from the young seal in the white coat or of reindeer.

The coat of the men does not open in front, but is drawn on over the head like a shirt, and has a hood that fits the head snugly, while the woman's hood is large and loose, and the jacket is quite loose-fitting, so as to receive the child, which is always carried in the hood. The woman's jacket further differs from the men's in being shorter in front, and ending in a rounded point, while behind it reaches quite to the ground in the form of a lance-shaped train. This appendage is caught up in the same manner as the fashionable train of the present day among civilized nations, when the condition of the ground is unfavorable for its trailing. After all, is not this fashion borrowed from the Eskimo? There is often an approach towards this prolongation in the men's jackets, especially when made of deer skin, but never so long as on the woman's. Neither do little girls have a long train to the jacket; but as soon as they arrive at the age when they are no longer looked upon as children, they learn to imitate their mothers. There are never any pockets in the jackets of either sex, the hood serving for this purpose.

The pants of the men are made from the same material as the coat, with the exception that the young seal in the white coat is often used for the outer as well as the inner garment. The pants reach only to the upper part of the pelvis, and are kept up by means of a string around the body. They reach a little below the knee, where they are met by the boots. When made of deer skin, they are usually ornamented by fringes of cut skin around the lower edges.

The women's pants differ from the men's in being composed of two separate pieces, the lower reaching from a little below the knee to the middle of the thigh, and are kept in place by a string which runs to the upper edge of the other portion. The lower portion of these pantaloons is removed while they are at work in their igloos, and the bare thigh used, as a board would be, to lay the seal skin on while cleaning the blubber from it. The women have the habit of thrusting their hands between the upper and lower pantaloons the same as we do in a pocket; in fact, they use this space as a sort of pocket.

Little girls wear their breeches like the men till they get to be ten or

twelve years of age. Very small children are dressed in a fawn-skin jacket without attached hood; but their heads are, nevertheless, well bundled up in a double fawn-skin hood that fits the scalp closely. This hood is never removed, except perchance by accident, till the child outgrows it. The lower extremities are usually not clad at all.

The children are carried *on* the mother's back inside her jacket. The cut of the jacket is such that the child goes down as far as the mother's waist, when the closeness of the jacket prevents it going any farther. The hood allows the child freedom for its arms and head, but the legs are cramped underneath its body, and this is probably one cause of bow-leggedness and possibly the shortness of the lower extremities. I have seen the Eskimo mother, with a child fast asleep in her hood, building a toopik. This work often necessitated her stooping over so much as to seemingly endanger the dumping of the infant over her head on the ground; still, it did not seem to inconvenience the child in the least, as it slept soundly through the whole proceeding.

The *kámik*, or, as generally pronounced, *kumming*, or boots, are principally made from the skins of adult *Pagomys fœtidus*, with the hair off, the soles being made from the skin of *Phoca barbata*. For winter wear a very beautiful and serviceable boot is made from the skin of reindeer legs sewed together lengthwise; they are used only in dry snow, being quite useless when the snow is wet. Another style of boot is to have the leg of netsick skin, but with the hair on. These boots reach nearly to the knee, and are kept in place by means of a string around the top, and also secured by a seal-skin cord passing over the instep and around the heel. They are generally sewed with sinews from reindeer; but for boots the sinews from the dorsal vertebræ of *Beluga catodon* are preferred when they can be procured.

The stocking worn next to the foot is of heavy reindeer skin, the hair side next the foot; they reach above the knee. Over the stocking is worn a sort of slipper made from the eider-duck. The bird is skinned by making an incision on the back near one wing; through this opening the body is removed. The skin is cleaned of the fat by the Eskimo's teeth, and the skin farther prepared by chewing it. The tail-feathers are removed, and this end becomes the toe of the slipper, the feather side being worn inside. Its upper edges are bound with some kind of skin to give it additional strength, and if the entire slipper is covered with cloth will last a long time. They are very warm and comfortable. *Larus glaucus* is often used for this purpose. For children they use *Uria grylle* and *Rissa tridactylus* skins. Over all this is worn another slipper

made from the netsick skin, with the hair on, and the hair side worn outward and the hair pointing from the toe backwards. This very much facilitates the drawing on of the boot.

For summer wear the young of the netsick in the woolly coat is substituted for reindeer for the stockings. Dog skin is also sometimes used for stockings, but not so commonly among the Cumberland Eskimo as among those of Hudson's Straits, who use dog skins for pants as well as stockings.

All the clothing is sewed with sinews, reindeer or white whale. The reindeer sinews are dried in bulk as they come from the animal, and are split off as needed. The fibres are separated as fine as necessary, and then drawn quickly between the teeth to secure a more uniform size. The women all sew towards themselves, using the thimble on the first finger; they seldom use but one kind of seam; the edges of the skin are carefully matched together, and joined by sewing over and over the overcast seam. Their thimbles (called *tikik*, also signifies first finger) are made from the skin of *Phoca barbata;* in shape they are merely an oblong piece sufficiently large to cover the point of the finger. A rim is cut around the outside edge for about one half its length; this forms a sort of loop under which the finger is passed, and in this manner it is kept in place. We found this style of thimble much more convenient than the metal one of the usual form.

Very few of the Cumberland Eskimo at the present day use anything but steel needles, or bone ones made after the same pattern. We have seen an instrument said to have been used as a needle that is considerably different from anything we ever saw before. An Eskimo brought it to us, and wanted a hatchet in exchange. We thought it certain he would return and offer to trade at our terms, but he did not, and we never saw him again. This tool was almost exactly like an awl in shape, but had an *eye* near the point. They must have had to thread this instrument for each stitch. The needle part was apparently of deer horn and the handle of walrus ivory.

The favorite and principal tool of the women is a knife shaped like an ordinary mincing-knife. Nearly all the Cumberland Eskimo have now procured iron enough from some source or other so that they can have an iron knife of this pattern. Before they could procure enough iron, they made the knife of ivory, and merely sank flakes or pieces of iron into the edge, in the same manner as the natives of North Greenland do at the present time. This same practice of sinking iron flakes into the

edge was also used on their large skinning-knives, which were made from a walrus tusk, and much after the pattern of an ordinary steel butcher-knife. Some of these ivory knives have no iron in them; but at the present time they are used principally, if not entirely, for cutting snow and removing ice from their kyacks.

The women seldom use any other kind of knife than such as just described. With them they remove the blubber from the skins, split skins, cut up meat, and when sewing this instrument is used instead of scissors. They begin a garment by sewing together two pieces of skin and shaping them as they go along by means of the knife, cutting for an inch or two and then sewing. They always *push* the knife *from* them when working it.

Tattooing does not seem to be as prevalent now as formerly, for it is mostly on the aged women that one finds it at present. The markings resemble India ink in appearance, and are done with gunpowder at present. Still, some use the old method, by taking the juice of *Fucus vesiculosus* L. (or a closely allied species), and some small algæ that apparently contain a good deal of iodine, and mixing with lampblack.

Instances came under our observation of people of apparently great age,—say seventy years and over, to judge from appearances; they had gray hair (a rare thing among the Eskimo), and were nearly blind; the women had the teeth worn close to the gums by chewing skins.

It is impossible to arrive at any definite conclusion regarding their age, as they keep no record of time and cannot refer to any past event by any means of notation. We could not learn of the rudest attempt at picture-writing or hieroglyphics; and, as they possess no records whatever, their traditions are handed down from generation to generation without being fixed by any means which allow even an approximate estimate of their growth and prosperity.

Most of them are unable to count beyond their ten fingers, and many are unable to go over six; some, again, are said to have names for numbers to twenty, but they are few. The numerals are differently pronounced, and we found difficulty in getting one sufficiently conversant with them to give us the numerals to ten.

One=*Atáusa*, or *atausat.*

Two=*Mácho.*

Three=*Píngasuit*, or *píngasat.*

Four=*Sésemíné*, or *sesemat.*

Five=*Tódlimené*, or *tódlimát.*

Six=*Aúkbinigan.*

Seven=*Pingashuing* (?).

Eight=*Aukbinigan-mackoni* (6 and 2).

Nine=*Schischimani* (? ?).

Ten=*Kowolin.*

Above ten they are said to count their toes and take ten and one, ten and two, &c.; but we were unable to find one who knew their names. They will tell you they have caught seals or birds up to six, but if more they generally put it *amashuadly* (a good many), which may be any number from seven upwards.

In the treatment of the sick they are very superstitious, and in fact they resort almost entirely to their *ancoot, angekoks,* or medicine-men.

The following is a Greenlander's legend that proposes to give a reason why people die: "The cause of people's dying is laid to a woman, said to have discoursed thus: 'Let the people die gradually, otherwise they will not have room in the world.'"

Others relate it in this manner: "Two of the first people quarreled. One said: 'Let it be day and let it be night, and let the people die.' The other said: 'Let it only be night and not day, and let the people live. After a long wrangle it came to pass as the first had said."

It is interesting that this same curious legend exists among the Eskimo of Cumberland Sound; they say though that "those who quarreled finally arranged matters and had both *entire* day and *entire* night at the different seasons, so that both parties might be suited."

The lungs of *Lepus glacialis* are considered as a sure cure for boils and all manner of sores; they draw, they say, and their manner of applying them is the same as we would a poultice. They must be applied as soon after the animal's death as possible, and while they are yet warm.

In cases of scurvy they never use *Cochliaria,* but the stomach of a freshly killed reindeer, with the vegetable contents, instead. If the scurvy patient be very bad, the limbs are bound with pieces of the deer's stomach, whale or seal's blubber, or any kind of fresh meat. If a whale can be caught at such a time, the patient is sometimes bodily shoved into the carcass, or the lower extremities only are sunken into the flesh.

The most prevalent disease among them seems to be lung disease; it is alarmingly common, and consumption probably kills more than all other diseases combined.

The whalemen have introduced venereal diseases among them, which have spread at a terrible rate, and devastate the natives almost like a pest.

I could not learn that they have any knowledge of the medical properties of any plant or shrub. Some of the coarser kinds of *algæ* are procured at low tide from the cracks in the ice, and eaten raw, but only because they are fit to eat, they say; the roots of *Pedicularis* are also sometimes eaten.

When the women are about to be confined they are placed in a small snow-hut, if it be winter, and in a little skin tent, if summer, by themselves. Their only attendant is a little girl, who is appointed by the head *ancoot* of the encampment. A little raw meat—deer, if they have it—is put into the hut with her, and she is left to give birth to the child as best she can. The reason she is removed from her tent is, that should mother or child die in the tent nothing pertaining to the equipment of the establishment could ever be used again, not even the tent-covering or the husband's hunting-gear. In some instances they are obliged to modify this custom somewhat. We have known them to cut the tent-cover about two feet from the ground all around and use the upper portion. A man's wife accidentally shot herself in her igloo, but the gun was too great a sacrifice; he used it, but the rest of his household effects were left to waste away where they lay. We knew of another instance where the tent-poles were brought into use again in the course of a year after a death had occurred beneath them.

As soon as the mother with her new-born babe is able to get up and go out, usually but a few hours, they are taken in charge by an aged female *ancoot*, who seems to have some particular mission to perform in such cases. She conducts them to some level spot on the ice, if near the sea, and begins a sort of march in circles on the ice, the mother following with the child on her back; this manœuvre is kept up some time, the old woman going through a number of performances the nature of which we could not learn, and continually muttering something equally unintelligible to us.

The next act is to wade through snow-drifts, the aged *ancoot* leading the way. We have been informed that it is customary for the mother to wade thus bare-legged, but (whether from modesty or the temperature of $-50°$ F. we cannot say) on some occasions this part of the performance is dispensed with.

When a sick person gets so far gone that they deem recovery improbable, he is removed from the hut, and either dragged out upon the rocks to die, or a little snow shelter may be constructed for him, and some scraps of raw meat thrown in to him. Usually such proceedings are apt

to end fatally to the patient, even though his ailment might not have been so dangerous had proper care been taken. We know of one instance where a man was thus put out to die seven different times; but he recovered and crawled back to his igloo, and looks now as if he was good for a number of years yet. Stories are common of how aged and infirm people are put out of the way by the younger ones, to rid themselves of a useless burden; but of this we know nothing from personal observations, or from reliable sources.

Occasional instances of suicide happen, generally when the person is afflicted with some incurable disease. Hanging seems to be the favorite mode of killing themselves.

The *ancoot's* manner of operating is various, and almost every one has some method peculiar to himself. We could get but a glimpse of some of them, as they are averse to having a white man witness their performances, and we had the greatest difficulty in getting any one to explain to us their meaning. The following legend is supposed to give the directions for becoming an *ancoot;* it is interesting that this legend does not differ essentially from the Greenlander's. (*Vide* Grœnlands nye Perlustration, Eller Naturel-Historie, Hans Egede, 1741.)

We would here add that those who become *ancoots* are only such as are naturally possessed of a more penetrating mind than their fellows, generally the biggest rascals in the encampment, who seldom pay any attention to what is right or just, but ply their vocation so as to win for themselves renown among their fellows, and possess themselves of any coveted article as remuneration for their services.

The manner in which one may become an ancoot, or angekok.

Any one wishing to become an *ancoot* must go away a long distance from where there is any other person. Then he must find a large stone, and seat himself by it, and call on *Torngarsuk.** This spirit will then make himself present to him. The would-be *ancoot* will at first be very much frightened at the arrival and appearance of this spirit, so much so that he is seized with severe pains, and falls down and dies, and remains dead for three days. Then he comes to life again, and returns home a very wise man.

* *Torngarsuk* of the natives of South Greenland, and *Tornarsuk* of North Greenland, is the highest oracle, the master spirit of these people. There are many spirits of less power, called *Tornæt;* these can be seen only by the *angekoks*, after their meeting with *Torngarsuk*. It appears that this word signifies the greatest spirit of Good, as well as of Evil. They now call the Devil *Torngarsuk*, and in their ancient belief their God, so to speak, the same.

An *ancoot's* duty is, first, to mutter over the sick, that they may become well again; secondly, he will talk with *Torngarsuk*, and get information from him as to how he must manage so that they will have success in their undertakings; thirdly, of him he learns if any one is about to die, and what the cause is, or if some unusual death or misfortune is about to occur to the people.

Their devotion and belief in the *ancoots* are unlimited; they can never be induced to trespass on the commands or disbelieve the prophecies of these important personages. When one has been a very successful *ancoot* for a long time he may become a great *ancoot;* this necessitates a period of fasting, and then, as the story goes, an animal they call *amarook* (the same word is used for wolf, and for an animal which is probably mythical, unless it can be a *Gulo*) comes into his hut and bites the man, who immediately falls to pieces; his bones are then conveyed to the sea, where he lives for some time as a walrus; he finally returns among his people, a man in appearance, but a God in power.

If the prophecy of an *ancoot* does not come to pass as he had said it would, any phenomenon of nature, as a halo, corona, aurora, &c., is sufficient to have broken the spell, and the *ancoot* loses nothing of his reputation by the failure, for it is then believed that the measure, whatever it might have been, was not pleasing to *Torngarsuk.*

The people come to these soothsayers after all manner of information. We knew of one case where a young woman asked an *ancoot* if her yet unborn child would be a boy or girl. He retired outside the hut for a few moments, and when he returned he said it would "be a boy"; but he adds, "If it is not a boy, it will be a girl"! For this valuable information he charged three seal-skins and a knife. As a general thing, the *ancoots* are paid according to their reputation; still, it is very seldom they refuse to give them what they ask for in return for their valuable services.

They seem to have an idea of a future state, but what we denominate as the region down below they consider as the best place. In Egede's Grœnlands nye Perlustration, year 1741, is given a legend which is almost exactly the same as one that is found among the Cumberland Eskimo at the present day. But Egede says, in the Danish translation, "Himmel," heaven, as though this was the equivalent for the Greenlander's word; the Eskimo of Cumberland say "topani," which means simply "up." They do not distinguish any difference in the soul's condition after death, or rather of the two places where they expect to live

hereafter; one differs from the other only in this wise, that if death is caused by certain means they go to the one, and if they die a natural death they go to the other.

The following is their idea of the future: "In the spirit-land *all* will have it as good as or better than they had it on earth." Yet they designate two places where the soul goes after death, viz: "Some go up; others far down into the earth." But the lower place is considered preferable. This is described as a beautiful land, with everlasting sunshine, where the seal and reindeer abound in fabulous quantities, and food is consequently abundant. To this latter place go only such as are killed by other Eskimo, women who die in childbirth, such as drown in *salt* water, and *whalers;* they think, this being the better place, it is a sort of recompense for the suffering they underwent on earth; all the rest go up.

In this connection we will mention that the Cumberland Eskimo think the *aurora borealis* is the spirits of dead Eskimo dancing and having a good time generally. It has even considerable influence over them, and they are well pleased to see a bright *aurora.* The Greenlanders, on the other hand, say it is the spirits of dead Eskimo *fighting.*

We have been told by some that those who hunt in the kyack and get lost or driven upon the ice or some uninhabited island are supplied with food from these regions; that is, living game is thrown in their way for them to capture, so they will not starve. This is firmly believed by them.

Unlike the Greenlanders, the Cumberland Eskimo of the present day have no permanent habitations. They may live at the same locality for several winters in succession, but each year construct a new snow-house. The Greenlander has a permanent sod or stone hut, and lives in tents only while away hunting. The Cumberland natives live in snow-houses from the time the snow gets firm enough to be fit to build with till it melts, in June. They generally begin the construction of the snow-house, or igloo, in the latter part of October. A place is chosen which is sheltered from the north, under the lee of a rock, if possible, and where there is a considerable depth of snow. They begin by treading a circular space about sixteen feet in diameter; on this they keep piling snow and stamping it down as hard as possible till the whole mass is a raised platform as hard as ice. They then cut out a square block from the middle, about eighteen inches deep. After this block is removed they have a chance to cut others from around the sides, and this space is enlarged till it becomes of the desired dimensions. The sleeping platform is left as they finished treading it, no blocks being cut from this portion; it

also serves to stand on while constructing the wall, which is always done from the inside, the builder being furnished with fresh snow-blocks from the outside when his supply gives out. The wall is built in a spiral form, so that, if viewed from above, it would have the appearance of a conical coil.

The only tools used in building are a saw, if they can get it, for sawing out the blocks, and a long knife, made from a walrus tusk, for trimming them into shape. In cutting and fitting the blocks of snow, they show skill and ingenuity, so that they make as perfect an arch as the best mason. When the hut is done, or rather enclosed, there is neither door nor window, and the builder is a prisoner. A door, however, is soon made, but at the opposite end from where the entrance is to be; through this aperture the women and children begin dragging in the "furniture," while the men "chink" up the places where the blocks join each other. The structure is so strong that it readily bears a man's weight on the top. When everything is ready inside and out, the lamps are lit; sometimes more than the usual number are procured, and trimmed to burn as brightly as possible; the heat begins to melt the inner surface of the structure, but it soon freezes and forms quite a coating of ice; this, of course, adds considerably to the strength of the building. The inside is now lined with the seal-skin tent of their summer toopiks, fastened up all around the sides and top by means of small pegs of wood or bone. A window is cut through the wall over the entrance-way, facing the south; it consists of a half-moon-shaped bow of whalebone, over which are stretched the intestines of *Phoca barbata*, sewed together lengthwise. This window admits the light quite well.

The entrances are long, low structures, sometimes only two, often four or even five. They gradually diminish in size from the igloo, but each one has a door, which is so low and narrow that a large person is unable to get through them, even on hands and knees. The door to the hut proper is barricaded at night with a slab of ice or the scapula of a whale. Ice is also sometimes substituted instead of seals' intestines for the window. On either side of the entrance-ways, the dogs are allowed to lie, but never inside the dwelling apartment.

About one-half of the floor at the end opposite the entrance-way is from one to two feet higher than the rest. On this platform they keep all their skins, and it is used for a general lounging and sleeping place. On the top of the snow they lay a coating of *Cassiope tetragona*, or something of this sort, and neatly spread the skins over it. One can see at

almost any time an impish-looking head, covered with a thick mat of tangled black hair, plentifully powdered with reindeer-hair of various lengths and colors, protruding from among the pile of skins. The whole family crowd together on this platform, like so many pigs. The lamps are kept burning day and night, and the woman's place is directly in front of them on the sleeping-platform. Here they sit cross-legged and work. Back of the lamps and around them they pile up their meat. This accumulation of garbage is only cleaned out when it becomes necessary to make room for a fresh supply. This pile of putrifying flesh soon becomes extremely offensive both to sight and smell. Meat is sometimes brought in the huts that is already spoiled, even though the temperature may be 50 degrees below zero. This often happens with deer. We think the cause may be that the body of the animal immediately freezes on the outside and forms a coating of non-conducting ice, which prevents the escape of gas, which instead permeates the tissues. If the animal is disemboweled as soon as killed, it does not happen. Several carcasses, still warm, are often piled one upon the other, and the animal heat is probably sufficient to start decomposition before the mass freezes.

Around the lamps lie the bones they have picked the meat from, and such other parts as are discarded in time of plenty. This rubbish is not thrown out, but rooted among after a fresh supply, as it is needed.

Nearly every igloo has a little addition on one side, with an opening to it from the inside of the main hut. In this they keep their deer-skin clothes when not in use, and also an extra blubber supply. Over the lamp is hung a half-moon-shaped frame of whalebone, with seal-skin thongs drawn tightly across. On this they put their foot-gear to dry during the night.

When the snow begins to melt, and their igloos tumble, they have a sad time for a few days. The skin-tent, or toopik, must now be brought into requisition and do service alone. For the toopik they select a flat rock, from which the snow has melted, and by means of two sets of poles, those for the front end of the structure the shortest, and lashed together at the top, like an Indian wigwam, with a ridge-pole between them. Over this the skin cover is spread, and secured to the rock by means of stones laid on the lower edge. All the after portion of this tent is made from seal-skin, with the hair on, on the back generally a large male *Pagophilus grœnlandicus*. The forward part is made from what they term *mamma*, which is prepared from the skins of the netsick in the following manner: After the blubber has been removed in the usual

way (the skins of pregnant females and those suckling young are the best), they *split* the skins, or rather remove a membrane that lies between the blubber and the skin proper. The splitting is done with the woman's knife. The skin is laid upon a flat surface and the knife pushed away from the operator. When the *mamma* is removed from the skin it is treated in the same manner as the skins, stretched, and dried in the sun. It is tough and transparent, and, being very oily, does not easily get saturated with water.

When the toopik is about to be raised, the skin covering is first stretched out upon the rock, and the poles are pushed underneath, and then raised up, stretching the cover as tightly on the poles as possible. The toopik is carried with them when they go hunting in summer.

Such habitations are of variable dimensions, regulated by the number of occupants somewhat, but more by the industry of the hunter and the economy of his wife, for the skins need repairing very often; and, as a consequence, many of the more shiftless natives have extremely poor shelters, patched up with dog and bear skin and old cast-away pieces of canvas, which they have paid well for in serviceable seal-skins.

Their greatest concern is to procure the poles. At present many get broken oars, lance-poles, &c., from the whalers; but still, ingeniously lashed together, bone supports for the tent are yet found among them. The inside arrangement of the toopik does not differ essentially from that of the igloo, except it may be a little nastier as a rule and smell a trifle stronger. Sometimes whale-ribs are made use of instead of poles, and are very ingeniously lashed together. These were more in vogue formerly, before they could procure poles from the ships.

We think they were perhaps less nomadic in past times, as there are still extant sod foundations, which were no doubt used as permanent abodes.

At the present day, so many of the Cumberland Eskimo have procured some kind of firearms that their primitive modes of hunting and their hunting implements have, to a great measure, been modified, and even in some instances altogether lost. Bows and arrows are fast becoming an institution of the past; they do not now rely on them for killing reindeer as they did at one time. Bows and arrows are found around the settlements, broken and out of repair; the arrows, of different kinds, lying about unused, or doing service as some other tool. The children all have bows and arrows; but they seldom kill larger game than snowbirds and lemmings.

Of prime importance to the Eskimo is his *unang*, or spear. At the present day, the sealing spear is often made from an old whale-lance, having a wooden handle and an iron harpoon-head (*vide* sketches). The socket of the lance is put on the opposite end of the handle, and is used for a variety of purposes. This kind of spear is very useful to the Eskimo in catching the seals in their *atluks* through the ice. They are extremely expert in the use of this weapon, and possess such marvelous patience that they will stand by a seal's *atluk* all day awaiting the return of the animal.

This spear is carried on all occasions wherever they go and whatever kind of game they pursue. The opposite end of the spear from which the harpoon is fastened is also their principal tool in building fox-traps of ice, cutting down hummocks so as to get their sledges over the shore-ice, &c. Not the least important use of this instrument is to sound the ice with it. In traveling they very often come to places where the rapid running tide has worn the ice very thin, and by means of this spear they carefully feel their way along. They will even cross on a floe that is completely rotten by feeling around till they get upon a more solid spot and then advancing. They are very much averse to getting into the water, as none of them are able to swim.

The harpoon-head used with this spear is made of iron, and is about three and a half inches in length and one inch between the outside tips of the barbs. They manufacture them entirely by filing, and will sit and file for many days till they get the instrument in the desired form.

For whales and walrus they use a much different weapon, the same, we imagine, as they used before the whites came among them. It is a large, awkward, bulky-looking affair, with a shaft made from the horn of *Monodon monoceros*, or from parts of a whale's jawbone, ingeniously lashed together, when wood is not procurable. Some have the handle composed of as many as eight to a dozen pieces, beautifully and compactly lashed together, till the whole is as firm as though it were composed of a single piece.

Although such large spears were not rare among these natives, we found difficulty in getting them to part with them. A favorite harpoon-head is also hard to procure, though they may not have used it for years. Some considerable value seems to be attached to these old implements, especially if they have been successful with them in former times. We depend more upon the illustration here given of this spear than upon the choice of words. Their old harpoon-head for seals was probably

of the pattern here figured. This specimen is from a grave at Exeter Sound, and greatly resembles in pattern the iron seal harpoon-heads of the present day. Others were made like the walrus harpoon, but having *barbs*, instead of being iron-tipped. A very ingenious contrivance about these old spears is the perfect ball-and-socket joint which unites the *eeheemung*, or bone portion (on which the harpoon is placed), with the shaft. The shaft, if made of wood, has a bone tip, which is cupped to receive the rounded end of the *eeheemung;* they are kept in place by two thongs of seal-skin, which makes it sufficiently firm to use, but at the same time will allow the *eeheemung* to double upon the shaft without breaking when an animal is struck.

As before mentioned, so few bows and arrows are now in use that it is almost impossible to procure a bow and set of arrows that *are* actually or *have been* in use. In the following illustration, no less than eight different patterns of arrows are represented. We have derived our information from various sources besides our own observations. We had instructed some of the most intelligent Eskimo to make for us wooden models of all the different kinds of arrows that they ever knew were in use. So far as we were able to procure or see the original, these models were faithfully and well executed, and leaves us no reason to think that they in any instance imposed upon us. Some of the arrows we have seen in the possession of sailors that had bartered for them for a mere song, but would not trade them to us, under the impression that they would bring fabulous sums in the States. They now probably adorn some third-rate gin-shop.

Of the arrows figured, No. 1 is made from reindeer antlers, with short wooden shaft, an old and very common form of arrow. No. 2 is perhaps still older. This is also made of reindeer horn. It is more common on the Greenland coast than among the Cumberland Eskimo. No. 3 is the only one of the kind I saw, and this I was unable to procure; the head was of flint, and the next piece of bone, with the wooden shaft lashed in two places, showing probably a scarcity of wood. No. 4 was a rare (?) form of arrow among the Cumberland Eskimo. The head was made of stone, with the forward portion of the shaft of bone and the rest of wood. No. 5 was iron-tipped, a favorite pattern when iron was scarce. No. 7 is now the style used by the children, and was probably the next pattern suggested after No. 5, as any pointed piece of iron can be utilized for this form of arrow. No. 6 has a lance-shaped and somewhat elongated iron head; such arrows were made only when they could get a considera-

ble iron supply. No. 8 is bone-tipped. I could not learn why the point should be so bent, but many had them so, and even preferred it. All their arrows were lashed with finely separated deer sinews. The feather-vanes were nearly always made from the primaries of *Strix scandiaca* or *Graculus carbo*. The arrows were all short; in fact, their length depended somewhat on the wood supply. We were unable to find but a single specimen of flint arrow-heads in the graves.

The bow is made from reindeer antlers; these are split, using only one of the halves in the construction of the bow. It is always made in three pieces, ingeniously lashed together. On the back of the bow are three or more strings, made like the bow-string; these are fastened at both ends of the bow, and also securely at the middle of the back. This of course gives additional strength to the affair, and is a convenient place to carry an extra string. The bows are very short, often not more than thirty inches. Not every Eskimo is able to manufacture his own bow; but each encampment has generally at least one skilled mechanic, who supplies the rest.

Bows and arrows were principally used in the capture of the reindeer, hare, and birds, seldom seals. These bows are surprisingly elastic, and the Eskimo are able to use them with wonderful dexterity. In shooting this weapon, the string is placed on the first joint of the first and second fingers of the right hand.

Another Eskimo implement fast going out of use is the *kakívak*, or salmon spear. A glance at the figure will give a better idea of this instrument than we can express in words. The two outside tines are each about seven inches in length, and are made of reindeer antlers. Near the tip and curving inward is a tooth-like prong about one and three-fourths inches in length. The points of these teeth come to the end of the middle tine, which is about six inches in length, perfectly straight, and made from walrus ivory. The three tines are securely lashed to a piece of the jaw-bone of the whale, of varying length, sometimes only a foot, but often two or three feet. When the bone shaft is too short to use, they generally have a short wooden handle lashed to it to make it the desired length. The two outside tines of this spear are very elastic, and spring out when a fish is struck, but close again when the body of the fish has passed beyond the tooth points which project inward. It is thus impossible for it to escape, the central tine having entered the body.

Another instrument, generally used in connection with the *kakívak*, is

the *ajâk-kaljûjak*, or ivory fish-bait. It is about four inches in length, and is made to look as much like a fish as possible. A line is passed through the middle of the back, and is fastened on the belly; here is a small ivory hook that reaches from an inch to two inches below the fish. The principal use of the *ajakkaljujak* is not, however, to *kook* fish, but to lure them within reach of the spear. The Eskimo takes his ivory fish and bobs it up and down in the water, generally in a tide crack or a hole in the ice on purpose, and watches till he spies a fish making for it. He then gently begins to haul in on his line, if the fish follows the lure, till it is within reach of his spear; sometimes a greedy fish will swallow the bait and get caught with this primitive gear. At the present day they seldom use this implement. Iron fish-hooks are supplied them from the ships; but they are poor fishermen compared with the Greenlanders.

One little implement of comparatively insignificant importance seems not to have been superseded by any modern substitute as yet. It is the *kadjuk*, a small piece of ivory of different shapes, used to insert in the lips of the seals while dragging them over the ice. We have given illustrations of the principal patterns we found in use. No. 8 is the same as No. 7 when seen from the top. This is a very ingenious piece of work. The main body of the piece is hollow, and the portion No. 11 has a head which prevents it pulling through, but at the same time turns freely, and prevents the line from twisting when the seal turns over. It is so well made that the inside piece cannot be got through any of the openings. No. 3. is No. 2 seen from the top. No. 10 is sometimes used as a part of the clasp on the sealing line. Nos. 1, 4, and 9 are the commonest patterns. No sealer's line is without one or more of these implements of some pattern or other; they are all made from walrus ivory.

Of prime importance to the Eskimo hunter is his hook for catching the young seal. Here again their old pattern has been modified by their contact with the whites. A glance at the accompanying figures will sufficiently explain the shape of these implements. The upper figure represents the ancient pattern; it was found in a grave in the Greater Kingwah Fjord, but so much decayed as to fall to pieces when handled; the hook part was made from a portion of a reindeer's antler, with a small barb cut near the point. Its resemblance to the iron hook of the present day is very apparent.

The sealing hook of the present day is made generally from a discarded whale lance; the handle is a light wooden shaft about five feet in length.

This instrument is used only to catch the young of *Pagomys fœtidus*, while they are still in the white coats; they are caught either while lying beside the *atluk* on the ice or while still in the snow-burrow. When an Eskimo sees a young seal on the ice, he begins to make his way cautiously toward it, stopping frequently, and giving the animal ample opportunity to satisfy its curiosity. The seal will work its head and fore part of the body in a jerky, awkward manner, and keep edging nearer and nearer to its *atluk;* the Eskimo watches every movement of the seal, and knows just the proper moment to advance a step or two and then stop. This manœuvre is kept up till he gets near enough to reach the seal with his hook. He then makes a quick jump, at the same time striking the hook into the animal. Sealing among the Cumberland Eskimo is sufficiently described under our notes on *Pagomys fœtidus*, in the report of the mammals, for us to leave it out of this paper.

When a seal-skin is about to be prepared for drying, the blubber is first removed somewhat roughly; the skin is then laid on a board, and with the woman's knife the membrane underneath the blubber is separated from the skin. The knife must be very sharp to do this successfully. The operators always push the knife from them; it takes considerable experience in order to do the job well. When all the blubber is removed, which will take three or four hours of faithful work, the skin is taken outside, and by means of the feet is rolled and rubbed around in the snow for some time, and by this process they succeed in removing every trace of grease from the hair. When thoroughly washed, the skin is put upon the stretchers, if it be winter, to dry; these stretchers are merely four poles, which are lashed together at the corners like a quilt-frame, the proper distance apart to suit the size of the skin. The skin is secured in place by seal-skin thongs passed through little slits along its edges and made fast to the poles. When the skin is properly stretched upon the frame, it is put above the lamps inside the snow-hut to dry. As the sun gets higher and begins to have some effect, the skins are stretched, flesh side up, on the southern slopes of snow-banks, and are secured by means of wooden or bone pegs about a foot in length. As the season advances and the snow melts they begin to stretch the skins upon the ground by means of the before-mentioned pegs. The skins are not allowed to rest upon the ground, but are raised a few inches to allow the air to circulate underneath. Skins dry very fast when exposed in this manner.

The first days of spring are always a busy time with the Eskimo

women. One thing is, they get more freshly killed skins to prepare, and then they generally have a surplus stock of the winter's catch which they could not take care of by the slow process of drying over the lamps in the huts during winter. The skins of the young in the white coats are dried in some considerable quantities, as it takes about fifteen to make a *single* suit of clothes, and many have *double* suits made from this material. They have no idea of any tan, and prepare the skins merely by rubbing them with their skin-scrapers.

We insert a sketch of a very old skin-scraper, such as are now found only in the old graves. It is made of stone, with a wooden handle, which is fastened to the stone by means of a strip of whalebone. Another and later pattern is made from the scapula of a reindeer. A better idea of its make can be got from the sketch than by a description. Such scrapers are still in use, but serve as a sort of auxiliary to a scraper made from a tin can, resembling a little scoop in shape, and having a wooden handle. This is the style of scraper made at the present day, and is by far the most effective instrument of the three. The manner of using these scrapers is to take the skin firmly in the left hand and putting the knee or foot upon the lower part of it holding it securely, while the scraper is worked with the right hand, pushing downward with some force. If the skins are very dry, when they begin they are somewhat softened by rubbing with the hands, or even chewing the most stubborn parts. They continue using these tools upon a hide till it gains the desired pliability. All the work of stretching, drying, cleaning, washing, and softening the skins falls upon the women.

The skins of *Phoca barbata* are stretched on a frame like those of the netsick, but not till the hair has been removed. The cutting of the hair is one of the nastiest and most disgusting sights one can imagine. It generally falls to the lot of some old woman to do this. The skins are allowed to lie and become somewhat putrid, a portion of the blubber remaining on. The only tool used is the woman's knife before mentioned. When about to clean one of these skins, the squaw takes off her boots, stockings, and pantaloons, and, tucking her feet under her body, lays this dirty, bloody, greasy, stinking skin on her bare thigh, the flesh side down. She then *pushes* the knife *against* the hair, cutting, or rather shaving it off. As her hand becomes too oily to hold on to the skin, she puts her fingers into her mouth, and thus cleans them. When properly cleaned, it is dried in the manner already spoken of, except that the back and belly of the animal are dried separately, as the skin is different on those por-

tions of the body, and would dry unevenly. When dry, it is almost as stiff and hard as a board. This skin is used mainly for the soles of boots; the pattern is cut from the hide, and then *chewed* till it becomes sufficiently softened to sew.. This last operation is also mainly performed by the old squaws. When they are too old to sew, they become *oojook* chewers as the last resort, and when their teeth fail them they are better off in the grave.

Seal-skins are also manufactured into drinking cups; such cups generally have a depth and diameter of about three inches. A short, straight piece of bone, mostly the humerus of a gull or duck, is sewed into the upper rim on one side, projecting outside about two inches and a half; this serves for a handle. The hair side of the skin is used for the inside of the vessel. Larger vessels, somewhat resembling a small sack, were used to carry water in at their encampments; but when out traveling, they mostly carry their water supply in a seal's stomach, prepared for the purpose.

We would naturally expect these people to be very expert in making various devices for capturing their game in traps or snares. This does not seem to be the case, however. They make a fox-trap, which is nothing more than a little round hut of ice, with a hole in one side just large enough for the fox to crawl into. Inside the hut is a large slab of ice, which rests horizontally upon a small upright piece of ice; the end of the upright rests on the bait, and when the fox pulls at the meat he draws the upright down, and the ice slab falls upon him and he is a sure prisoner.

Another manner of catching foxes is to make an ice house much larger, so high that a man can readily stand up in it. A small funnel-shaped hole, just large enough to admit the fox, is made at the top of the structure, and the bait is hung inside just out of his reach. The fox will work a long time trying to secure it, and finally crawl in and jump down upon the floor of the hut, but then he is unable to get out again.

A sort of snare is sometimes made for hares. It is nothing more than a seal-skin line, with a number of slip-nooses upon it; this is laid across the runs of the animals, or upon their feeding-grounds. They are often caught in this manner; but the foxes are generally the only ones benefited by the capture; all that the Eskimo finds is a little hair and a few bones the next morning.

Birds are sometimes snared in about the same manner, except that

they use finely braided deer sinews for the snares, instead of seal-skin. They take a good many eiders on their nests in this manner.

When traveling over the frozen wastes in winter they use snow-shoes. These are half-moon-shaped, of whalebone, with seal-skin thongs tightly drawn across. They are about sixteen inches long. Another pattern is merely a frame of wood, about the same length, and eight or ten inches wide, with seal-skin thongs for the foot to rest on. As their dogs' feet often get very sore while traveling on crusty snow, they make them little moccasins of seal-skin to protect the feet.

Nearly all the Eskimo become snow-blind in spring, though they use eye-blinkers of wood. These are only a piece of wood fitting closely over the eyes, and having a horizontal slit about one-sixteenth of an inch wide; it affords a good deal of protection to the eyes, but they are generally not put on till the condition of their eyes forbids them going without. Some eye-blinkers of bone were found in a grave; they were apparently very old, and of a different pattern, but so much decayed as not to admit of handling.

All the Cumberland Eskimo of the present day have sledges of wood. This has either been bartered from the whalemen or secured from the wrecks of ships. There are, nevertheless, some remains occasionally found of sledges that were composed entirely of bone, whales' jaw-bone apparently. They were made in many pieces, and ingeniously lashed together. All their sledges of the present day are shod with bone, and when about to undertake a journey they pour warmed blood upon the under surface of the bone shoeing; some use water, but this does not last nearly so long as blood, and is more apt to chip off. This coating makes a very smooth surface, and also protects the runners. All their sledges have a sort of upright on the back end. This is nothing more than a deer's head, with the antlers attached, the antlers being lashed on the top edge of either runner. This serves for a variety of purposes, and is very handy indeed.

The kyack of the Cumberland Inuit does not seem to have undergone any change in pattern since the whites came among them. Still, these craft are extremely rude and bulky, compared with the Greenlanders' kyack; neither do they compare with the Greenlanders in expertness in its use. These kyacks are mostly so large that they would readily carry two persons, and quite heavy. They do not carry so much gear upon their kyacks as the Greenlanders; the seal spear, walrus spear, and bird spear, with their respective lines, are about all, unless they are after some

special kind of game, as, for instance, bears; then they carry a bear lance, which, however, does not materially differ from the whale lance. The *omiak*, or woman's skin boat, is now rare among them, as they are able to procure whale-boats from ships, and one boat will accommodate several families. Some of these boats still exist in the vicinity of Nugumeute and farther south. It required about fifteen skins of *Phoca barbata* to construct one, and several years' accumulation of drift-wood.

It seems very probable that before the advent of whalemen they practiced a great many rites and ceremonies, many of which are now obsolete, or exist only in tradition. Sometimes one of these old customs will be repeated, but, as a general thing, not in the presence of a white man, if they can help it.

One of these customs, which possesses a good deal of interest, is their manner of greeting a stranger. When a stranger arrives at an encampment, and is personally unknown to all or the major portion of the inhabitants of the village, he receives an introduction after the following manner: The villagers (the men) form themselves into a single rank, all of them, with the exception of the stranger and the head *ancoot* of the village, having hare-skin mittens on; they then begin a monotonous singing chant, keeping time with their arms, swinging them in front, raising the hand as high as the shoulder, with arm slightly bent, and then describing a half circle by lowering the hands as far as the abdomen. Finally, the *ancoot* and the stranger step out from the ranks and face one another. Both have mittens of seal-skin. The stranger complacently folds his arms over his breast, and inclines his head to one side, so as to fully expose his cheek, while the *ancoot* deals him a terrible blow on it, sometimes felling him to the ground. The two actors now change parts, and it becomes the stranger's turn to strike, which he does with a vengeance; the two then kiss each other, and the ceremony is over. The stranger is now duly initiated to share in any and all their customs, and due hospitality is shown him by all. Among his privileges he can also choose for himself a wife during his sojourn.

Another custom, which was once very popular, is the following: An *ancoot* dresses himself up in the most hideous manner, having several pairs of pants on, among the rest, and a horrid-looking mask of skins. The men and women now range themselves in separate and opposite ranks, and the *ancoot* takes his place between them. He then picks out a man and conducts him to a woman in the opposite ranks. This couple then go to the woman's hut and have a grand spree for a day

or two. This manner of proceeding is kept up till all the women but one are disposed of. This one is always the *ancoot's* choice, and her he reserves for himself. The people thus assembled are, of course, all well known to him, and he understands pretty well how to mate them so as to meet general approbation.

When the women have their monthly courses, they will not work, nor visit the ship, or even each others' huts.

The dead are generally covered with a little pile of stones, so arched over as to form a sort of tomb. It is also quite common at the present time to leave the dead fully exposed upon the rocks. All the Eskimo have a great horror of handling a corpse, so that when a person is very sick he is *carried out to die*, and where he lays the stone pile is erected around him. The hunting implements and many of the valuables of the deceased are put by him; such things as he will need for a long time *inside*, and the rest *outside* of the grave. We have found in one grave the skeletons of two dogs, remains of a sledge, whip, &c., and the partial skeleton of a *Pagomys fœtidus*. The right femur of the Eskimo skeleton in the grave was deformed, and had the appearance of having been broken and allowed to grow together without setting. He was probably lame during life, and the dogs and sledge had been given him in order to facilitate his traveling to the happy hunting-grounds. In another grave we discovered portions of a kyack. That decayed bow and arrows, spears, and all their hunting implements, were at one time plenty in graves, is very apparent; but of late years they have so amended this usage that it is no longer necessary for the articles to remain very long, so they are taken out and used by the relatives. In very recent graves we found tin cups and pots, knives, and even one fork and spoon, *comb*, pieces of cloth, needles, thread, thimble, and in one a *photograph* and a *Harper's Weekly newspaper*, tub for meat, &c.; in fact, all the equipments and treasures of the deceased. The more valuable of these articles were outside, and would undoubtedly soon have been appropriated by the relatives. This is the reason that so little is found in graves at the present day. In the old graves the wood and bone implements seem to decay very fast, and can seldom be handled without falling to pieces. All the graves contain entire or partial skeletons of some animal or bird, mostly the netsick seal. This was put in for food, undoubtedly. Very few graves contain the perfect skeleton of the inmate. The dogs, wolves, and foxes despoil the graves, and scatter the bones in every direction. It is seldom that these tombs are so well constructed that the dogs cannot tear them down.

As a rule, they are not kind to the aged or feeble. We know of one instance where an old cripple, who had no one who would recognize his authority, was obliged to go sealing for himself. He had but one dog, and no sled; so, taking a seal-skin and allowing the dog to drag it, he was conveyed to the sealing-ground on this novel conveyance. There were every day large sleds leaving the encampment, but no one offered to help the old man, as there was no prospect of his being able to reciprocate the favor.

Among their many superstitious notions, the wearing of charms about the person is one of the most curious. These are called *amgoouk*, or *amusit*, and may be nothing but pieces of bone or wood, birds' bills or claws, or an animal's teeth or skin. To these charms they attribute supernatural powers, and believe them to be able to keep the wearer from sickness or misfortune. It is a common custom for the wife to throw a piece of seal's blubber on her husband's kyack when he is about to go hunting; this will give him success. Little strips of deer-skin are hung about the person in different places to insure success in some undertaking or to ward off some misfortune, real or imaginary. We discovered one of these charms, which seemed to possess unusual interest. It was worn by a little girl about eight years old. She had a small envelope of seal-skin that was worn on the back of her inside jacket. We succeeded in bribing her grandmother to show us the contents of the envelope, which proved to be two small stones, the one a bluish flint, the other *apparently* meteoric iron. The tradition connected with these stones, the grandmother said, is that a very long time ago an Eskimo, from whom she was a lineal descendant, had discovered the iron, and had picked up a stone to break a piece off and take home with him; but when he struck the iron fire flew from it, and he soon learned how to make use of this accidental discovery, and became a great man among the people. At this point we lost the thread of the old woman's narrative, and all we could further learn was that these two small pieces had been preserved in the family for successive generations, and were inherited by her from her mother, and that she had now given them to her grandchild, the child's mother being dead. The child will in turn give it to her children. She thought this charm of inestimable value, and could not be induced to part with it, for, she said, "No one has yet died while wearing this charm."

Another charm of great value to the mother who has a young babe is the canine tooth of the polar bear. This is used as a kind of clasp to

a seal-skin string, which passes around the body and keeps the breasts up. Her milk supply cannot fail while she wears this.

Many of the *ancoots* by long practice become quite competent jugglers, and often take advantage to show off their powers to the edification of their friends. A common trick with a full-fledged *ancoot* is to come suddenly into a hut with a harpoon toggled on his breast, and the handle sticking in his back, the wound bleeding profusely. Such demonstrations make a lasting impression upon the minds of those who witness it, and it becomes no less marvelous when they see that he survives, without even a mark after the wound.

A very interesting legend is one which they tell as to the origin of man, as regards creation, and the beginning of all things. They say it came so of itself. Of the creation of man they say: In the beginning there grew up from the earth a man; he got a wife from one of his *thumbs* (!), and from this pair the race has originated. But the whites, whom they call *cablunet*, or *codlunak*, they have sprung from *dogs*. An Eskimo woman at one time gave birth to human beings and dogs. These latter she put in an old boot, and threw them out into the sea, saying, "Go hence, and become white people." From this they say whites live on the sea, and their ships are like the Inuits' boots, round at both

MAMMALS.

FRAGMENTARY NOTES ON THE MAMMALIA OF CUMBERLAND SOUND.

By Ludwig Kumlien.

The following list contains little else than fragmentary notes on such species as I procured, or with certainty identified, during my short sojourn in the northern waters of Cumberland Sound (the Hogarth Sound of Penny), at about lat. 67° N.

The region about our winter harbor was marvelously barren, and very few mammals are found there. Its location is such that many of the species that frequent the southern waters are seldom found about Annanactook, as it is so far "inland." It is a rarity for a bear to stray up the sound any distance, and some of the seals and most of the cetaceans are only of irregular occurrence.

Near the southern entrance of the sound, however, the harp seal, polar bear, walrus, and many of the cetaceans, are regular visitors. I have not the least doubt that many cetaceans are found in these waters that I did not see. Should I place confidence in the information of whalemen regarding whales, I could easily make out many species, and some very marvelous ones; but my experience has been that whalemen generally are not to be relied upon in this matter, as they confound species to such a degree that one can never unravel the snarl, and their own peculiar nomenclature makes matters worse instead of better.

My stay was also much too short for anything like a satisfactory investigation of certain interesting problems. I was even obliged to leave some valuable skeletons, and could have procured many more had there been any place to stow them away on shipboard.

There seems to be a prevalent belief among the Eskimo, as well as the whalemen, that the mammals have disappeared from this section of country at a wonderful rate within the last few years. I found the remains of *Trichechus rosmarus*, *Cistophora cristata*, and *Ursus maritimus* in the ancient kitchenmiddens in Kingwah Fjord, in localities where these animals occur at the present day only as rare stragglers. It is hardly probable that such large animals could have been brought any distance,

so they must at a comparatively recent date have been found in the immediate vicinity. I could find no trace of the musk-ox, or any Eskimo that had seen one; but almost any of them could describe the animal very intelligently, and would tell you they are found far to the north. The Eskimo name for this animal, "omingmuk," is by no means a rare *name* among them, and it is possible that they were once found on Cumberland Island, but are now extinct, as other species are in a fair way of becoming.

The vicinity of the Kikkerton Islands offers many advantages to a naturalist; it is now a permanent whaling station, and a person could at any time secure the valuable assistance of natives, besides having ample conveniences for drying, stowing, &c. It would be comparatively easy to secure a good skeleton of an adult right whale at this place if a person went about it in the proper manner. Almost any of the smaller cetaceans, and all the seals, adult, young, and fœtal, could be secured at a very trifling outlay of presents to the Eskimo.

1. Ursus maritimus, Linné.

"Nannok," Cumberland Eskimo.

It is a rare occurrence to find a bear any distance up Cumberland Sound; they are common about Cape Mercy, Shaumeer, and Nugumeute, but seldom stray above Niantilic, or the Kikkerton Islands. Below Niantilic, on the southern side of Bear Sound, in the vicinity of what the Eskimo call Okaglik and Kokaluyah, they are quite plenty. Many are captured here every year, especially in spring, by the Eskimo, who fearlessly attack them in their frail kyacks, but are afraid of them on the ice or land. From Nugumeute to Hudson's Straits they appear to be even more plenty, and westward, in the northern waters of Hudson's Bay, whalemen often procure twenty or more skins in a season.

In October, 1877, an enormous female with two cubs paid the Eskimo encampment, at the Kikkerton Islands, a visit. They swam over the Salmon Fjord, probably scenting a dead whale that was on the beach near the huts. The bears made a lively time among the huts, and a considerable outlay of ammunition and dogs was made before they were finally captured. There were about two hundred dogs and half as many natives, besides the crews of two whalers; all this motley crowd made war on the bears; one of the whaling captains, a little braver than the rest, got too close to the old bear, and she dealt him a blow which knocked his gun many feet into a snow-bank; she then began to make way with him, but was prevented by the Eskimo and dogs. A young Eskimo was

served in a similar manner, but sustained quite serious injuries. Great consternation and fear prevailed among the women and children, and that memorable night, when the *nannokes* besieged their quiet camp, was long a lively topic of conversation.

When the Florence took the pack-ice off Cape Mercy, a huge male was suddenly espied alongside, but he did his best to get away as fast as possible; a boat was lowered and his capture was as devoid of excitement as the killing of a sheep in a barn-yard. We had at this time sixteen Eskimo and thirty dogs on deck, and the greater portion of the meat was utilized as food by one or the other without any symptoms of poisoning. During the season that *Pagomys fœtidus* have their young, the bears begin to wander up the fjords in search of them, and are at this time often found a considerable distance from the open water.

In and about the old stone-hut foundations in the neighborhood of Annanactook I found the remains of bears. There is a story among the Eskimo that the bear, walrus, and hooded seal were once plenty there, but for some cause do not now frequent the locality. A very young cub skin was secured in April by a Shaumeer Eskimo. The vicinity of Cape Mercy is one of the most frequented localities for bears; here they come down on the pack-ice with the current from the north. Eskimo from the region northward in Cumberland are in the habit of coming here to hunt them.

2. Vulpes lagopus, Linné.

"Touyunaik," Cumberland Eskimo.

The Arctic fox is quite common on both sides of Cumberland in all suitable localities. During the winter they often fare badly, and become quite impudent when pressed by hunger, even coming upon the schooners' decks at night. They were a source of annoyance as well as amusement to us around our observatory. We were not the fortunate possessors of enough glass to let the light in through the wall of snow that surrounded our tent, so we had recourse to oiled sheeting stretched over the aperture, borrowing the idea from the Eskimo window of seal intestine. But as we had no dogs about our snow-house, the foxes became so bold during the long cold nights of winter that they often came and sat around the stovepipe that projected through the roof of the hut. Our cloth windows had to be repaired very often, as they would tear them down and eat them for the oil the cloth contained. It was almost impossible to catch them with a steel trap. I tied the bait underneath the tongue, and carefully placed the trap in a little excavation in the

snow, and covered the whole with snow; but they dug beneath the trap, and secured the bait from below, often even without springing the trap. With an ice trap made after the Eskimo pattern I was more successful.

As soon as the seals begin pupping, the foxes fare better; this season is in fact the grand banqueting time for these animals, after the long sufferings and privations of winter. At this season (March, April, and May), they destroy a great many young seals. I have often found the remains of the seals so well *skinned* and cleaned that it seems impossible it could have been done by an animal. They begin by biting the skin around the mouth, and drawing the entire animal through the aperture, and turning the skin inside out; even the flippers are drawn through to the nails, and every vestige of the meat removed. Nor is the skin bitten in the least, although it is finely cleaned of all the fat. But the most remarkable part of all is, that the skeleton remains intact and finely cleaned. When the Eskimo find such skins, they always make use of them, as they are quite as well skinned as if they had done it themselves. The white variety appears to be much more abundant than the blue. According to the Eskimo, the two varieties interbreed, and the young are sometimes dark and both parents white, and *vice versa*. During the winter months they congregate in considerable numbers about any carcass, especially a whale, and get themselves thoroughly begrimed with grease.

It often happens that some venturesome fellow succeeds in getting upon the ducks' island, in breeding time, by means of the ice, and is left there; but when the birds leave he gets enough shell-fish, &c., at low-water to live on till the ice makes. If they are a short distance from the mainland or from other islands, they do not hesitate to take to the water.

3. Canis familiaris, Linné, var. **borealis**.

"Kidmik," or "Mikkie," Cumberland Eskimo.

As might be expected, the dogs of the Cumberland Eskimo are afflicted with the much dreaded rabies. I paid considerable attention to the subject, in hopes of being able to throw some light on the cause of this disease, but, like many others before me, with little success. In the first place, so far as the dogs about our winter harbor were concerned at least, there are other causes besides the so-called hydrophobia that lessens their ranks, though when a dog dies this is always the cause assigned. Some of the best dogs that died at Annanactook during the winter of 1877-78 died from injuries inflicted on the head by a club in the hands

of their masters. After these dogs were disabled they wandered about the settlement staggering and howling, and were to all appearance *bona fide* victims of hydrophobia; but on dissection it was only too plain what the matter was. Many of the dogs are so overworked and so illy treated that they could not survive the repeated injuries inflicted upon them if they were as strong again.

The Eskimo have the habit of putting a slut in heat on ahead as leader, as by this method they considerably accelerate the movements of the rest of the team, and save themselves some extra labor; but these dogs often prove themselves too eager, and rupture blood-vessels. I have seen such cases where the dog vomited clear blood, and also discharged it copiously through the anus; such cases survive but a few days generally. Again, many young dogs are taken from the mother long before they are prepared by nature to shift for themselves. I have positive evidence of this being a prolific cause of so many *young* dogs dying. Of all the dogs that died at Annanactook, at least four-fifths of the adults were males, and the greater number of these died about the time the females were in heat.

I was very much interested to see if the theory that hydrophobia is prevalent only in countries where the females are subjected to indiscriminate slaughter, or animal instinct thwarted or perverted under the ban of an ignorant and false modesty, would work here, instances being cited of Turkey and other countries, where the dog is held sacred and allowed to run at large, that hydrophobia is unknown. According to the theory, then, that its origin is always the result of unrequited affection, we should *not* find this disease among the Eskimo dogs, where it may reasonably be expected that nature has allowed the proper proportion of the sexes and man does not interfere; but here is the point: Has the Eskimo dog unrestrained freedom to follow the instincts of his animal nature? We answer, By no means. To be sure, there are plenty of females, but they are appropriated by such dogs as possess the greatest strength; the females go to them, and the weaker dogs are given the cold shoulder. As a general thing, the possession of a slut is a disputed point, which ends in a hard fight between the dogs; but there is no further question after the battle, and the vanquished dog has to bear a double disappointment; this he seems unable to do, and worries himself into a melancholy that soon takes the form of the so-called hydrophobia.

I carefully watched a team of three dogs that I often went sealing with; one was a female and two were males; the slut seemed to be ap-

propriated by one of the dogs without question, till one day a strange dog from another settlement was added to the team. The possession of the slut now became the cause of a series of severe fights, which ended in favor of the strange dog, which immediately became the guardian of the slut. The beaten dog began to lag and droop, and in a *few days was dead*, having gone through all the stages of hydrophobia to all appearance.

This was not the only instance of a similar nature that came under my observation; still I do not wish to be understood that I place unshaken faith in this theory. I had too short a time for observation, and too few examples to warrant me in making generalizations on these data; but I think it well worth the time for any one who does get the opportunity not to overlook these facts. I dissected a number of the male dogs that died from the rabies, but I never could detect any of the organs diseased except the penis, testicles, and sometimes the kidneys. Why this should be the case I am at a loss to say. There is one other theory that may throw some light on the subject, viz, the constant interbreeding of the dogs. I have known of instances where a dog had possession of the mother and her yearling whelps, all, mother included, of which he was father to. It is certain that the progeny resulting from such connections are very inferior, and tend toward degenerating the race. It often happens that female dogs cohabit with wolves, the dog being driven off by the superior strength of the wolf. This progeny again is characterized by superior strength and great powers of endurance, and is less apt to suffer from disease.

It sometimes happens, the Eskimo tell me, that a family goes into the interior and remains for a year or more, but seldom loses any dogs by disease; they have an idea that the salt-water has something to do with their dogs dying, for they say they do not die when they live away from it. It does not seem probable, however, that the disease would prove contagious, assigning either of the above causes for its origin.

Again, is it positively known that the disorder *is not* communicable by bite? I am by no means sure of this. The Eskimo always carefully get out of the way of dogs afflicted in this manner, and they told me that if one of the sick dogs bit me I would get the same disorder. This information may have been imparted to them by whalemen, however.

4. Canis occidentalis, var. **griseo-alba**, Bd.

"Amarook" (?), Cumberland Eskimo.

Wolves are frequently seen during the winter months on both shores of Cumberland; their principal resorts, however, are further inland,

where the reindeer herds abound. It often happens that the Eskimo dogs and wolves interbreed; the female dog is especially liable to cohabit with a wolf, and the progeny are considered much superior beasts, but are very hard to manage. I have seen Eskimo dogs that corresponded hair for hair with the Arctic wolf.

The Eskimo say there are packs of dogs now in some localities that have run wild, and in all probability returned to the original wolf type. There are stories of some kind of animal, that from the description given by some may be a *Gulo*, but others say it is only the common dog; such animals are always reported from the interior.

It is said that the female wolf is considerably fleeter than the male, being longer-bodied. The females, the Eskimo say, always distance the males in the chase after the reindeer, and generally succeed in killing the deer before the male comes up.

5. Mustela erminea, Linné.

Two specimens, procured in the Kingnite Fjord, one in the summer and one in the winter fur. Appears to follow the lemming in their migrations; is nowhere abundant in Cumberland, and even unknown to some of the Eskimo. Said to be able to capture the hare and ptarmigan by attaching itself to some vital part and not loosening its hold till the victim is dead. I am rather skeptical on this, however. Still, the Eskimo say they have seen them do it, and it really puzzles me to tell what else they should live upon during winter, as they do not hibernate.

6. Myodes torquatus, (Pall.) Keys. & Blas.

"Awingak," Cumberland Eskimo.

I procured but a single specimen of the lemming; this was caught near Cape Mercy. They may yet be common somewhere along the sound, as I saw traces in different places where we stopped. According to the Eskimo, they are getting less common every year. Whalemen have told me that twenty years ago some ships procured as many as four hundred skins at Niantilic, in the spring, from the young Eskimo, who killed them with bows and arrows. From what I could learn of the Eskimo, the lemming is very irregular in its migrations, appearing in great numbers at one place, and then disappearing for many years.

7. Lepus glacialis, Leach.

"Okoodlook," Cumberland Eskimo.

Common in all suitable localities. Many do not undergo any change of color during summer, and I doubt if it be more than partial change

with any. I have seen pure white specimens during all the summer months, and occasionally one about half-gray. The Eskimo firmly believe that the lungs of the hare applied fresh to a boil or sore of any kind is a sure cure. The specimens I examined in Cumberland were much smaller than Greenland specimens.

8. Rangifer tarandus, (Linnó) Bd.

"Tuktoo," Cumberland Eskimo.

The reindeer are found in considerable numbers on both sides of Cumberland Sound, but by far the greater number on the western shore. It is no rare instance to find them during the summer months on the sea-coast; they seem to delight in feeding upon the *fuci* exposed at low tide. In winter they retire to the larger valleys and go farther inland, being seldom seen on the coast at this season of the year.

The Eskimo go reindeer-hunting every summer, commonly during the months of July, August, and September. At this season they make quite extensive excursions inland, where the deer are more abundant and much more easily procured. Within the last few years they are reported as less common on the Penny Peninsula; but I hear of no apparent diminution in their numbers to the west and southwest, especially toward Lake Kennedy, where they are reported as very abundant.

Before the introduction of firearms among the Eskimo by the whalemen, they took advantage of the habits of the deer in coming down to the coast, and drove them into the water, where they were easily captured with a kyack. The Eskimo bring the skins back with them to their winter encampment, having cached the meat for the ostensible purpose of returning for it in winter. This seldom happens, however, and the wolves generally make way with it. It is said that when a herd is first approached by a hunting party that has been living on the sea-coast, they scent them a long way off, but that they soon lose this power; the fact being, I take it, that the peculiar odor of the salt-water has left the Eskimo. During the winter they herd together in large droves, and when a suitable valley is found paw up the snow for a considerable extent, till it looks as if a herd of swine had been rooting in the snow. These droves are continually beset by packs of wolves, which keep a vigilant watch for any that unluckily stray out of the herd, for such a one is immediately attacked and run down. It is seldom, however, that the wolves can do much damage to the herd when they keep together, as they form a circle, with the weaker ones in the centre, and can thus keep the wolves at bay.

9. Callocephalus vitulinus, (Linné) F. Cuv.

"Kassigiak," Cumberland Eskimo.

The so-called "fresh-water seal" of the whalemen is one of the rarer species in the Cumberland waters. They are mostly met with far up the fjords and in the fresh-water streams and ponds, where they go after salmon. They are rather difficult to capture, as at the season they are commonly met with there is so little blubber on them that they sink when shot. The skins are highly prized by the Eskimo women for their jackets, and if they do not have enough for the entire garment will use what they have, always putting it within the most convenient sight of the wearer. It is said by the Eskimo that the young remain in the white coat but three or four days, differing greatly in this respect from *Pagomys fœtidus*. Neither do they make an excavation underneath the snow for the reception of the young, like the above-mentioned species, but pup later in the season, on the bare ice, fully exposed. The adult males often engage in severe combats with each other. I have seen skins so scratched up that they were nearly worthless; in fact, the Eskimo consider a "kassiarsoak" (a very large kassigiak) as having an almost worthless skin, and seldom use it except for their skin tents. The skins of the young, on the contrary, are a great acquisition. It is said, possibly with a shade of exaggeration, that the affections of the Eskimo damsel can be secured by a present of kassigiak skins, when all ordinary means of persuasion have failed to move her.

10. Pagomys fœtidus, (Fab.) Gray.

"Netsick," adults generally; "Tigak," adult males; "Netsiavik," young after shedding and till one year old; "Ibeen," young in white coats, of the Cumberland Eskimo. "Pickaninny pussy," young, pigeon-English of the whalers.

This seal is very common in all the fjords and bays from Hudson's Straits northward along Cumberland Island to the extreme head of Cumberland Sound, on all the outer islands about Cape Mercy, and on the west coast of Davis Straits. I have seen skins from Lake Kennedy that I could not distinguish from those found in Cumberland Sound. This seal was never noticed but a few miles from land; was not met with in the pack-ice, nor on the Greenland coast except far up the fjords. This was in July and August; but I am informed that they become more common toward autumn, and are found in considerable numbers some distance from land; they are less common here, however, than on the west coast.

It was a source of great curiosity to the Greenlanders to see the

clothing of the Cumberland Eskimo made from the skins of the young seal; they at first mistook it for bear. I was informed that, in the vicinity of Disko at least, they never procure enough of the skins of the young in the white coat to use them for clothing to any extent.

In the Cumberland waters they are resident, and do not migrate at all unless much disturbed, and then they merely seek a more secluded locality. On the Greenland coast they appear to migrate up the ice fjords in summer, but to be more generally distributed at other seasons.

The netsick shows a decided predilection for the quiet still bays and fjords, seldom venturing far from land. They are the only seal caught through the ice in winter, and are consequently the chief and almost sole dependence of the Eskimo for food, fuel, light, and clothing.

The skins of the adults are made into summer clothing, while the young are in great demand for under-garments and for trousers. Children often have entire suits of the young in the white coats; such clothing looks very beautiful when new, but it is new but a few days, and after this it is repulsive enough. The females were found *enceinte* in the latter part of October, and a fœtus nearly ready for birth was taken from the uterus January 16. It was two feet from the end of nose to the end of hind flippers. It was so doubled in the uterus, however, as to occupy a space hardly a foot in length; the hind flippers were turned forward on the tibiæ, the fore flippers hugged the sides, and the head bent over on the neck and inclined to one side.

In a large fjord known as the Greater Kingwah the tide runs so swiftly at one locality that it never freezes for a space varying from ten to one hundred acres. Here the netsick gather in considerable numbers all winter, and it is a favorite resort for such Eskimo as are fortunate enough to possess a gun. Being but a few miles from our winter harbor, there were almost daily excursions to these tide rifts by our Eskimo hunters. After the 1st of March very few pregnant females were killed at this place, they having by this time chosen the localities for having their young. Those killed after this date were all adult "tigak," or old stinking males.

It was interesting that the young—yearlings and some two-year olds, such as had not yet arrived at maturity—were seldom, if ever, killed in this open water, but lived in colonies by themselves. When an Eskimo finds a number of *atluks* (breathing-holes) near together, he always marks the place by raising little mounds of snow near the holes, for he knows that here is a colony of young animals, which have better skins and

meat than the old ones, and are moreover much easier to capture. I have counted nearly seventy of these atluks on a space of two acres.

When a pregnant female has chosen the place where she is to have her young, she makes an excavation from six to ten feet in length under the snow, and from three to five feet wide, the height varying with the thickness of the snow covering. The atluk is at one extremity of this excavation, and in such a position that it is always a ready channel of retreat in case of danger.

The first young found in the Upper Cumberland waters was during the early days of March; still I have taken a fœtus from the mother in the middle of April. The most profitable time for hunting the young seal is during the month of April; after this date they have shed so much that the skins are nearly worthless till the hispid hair has got to be of the proper length, when they are considered as the prime article, and second only to the young of *Callocephalus vitulinus* in quality.

The first young one I procured that had begun to shed was April 15. I have seen examples that were nearly or quite destitute of the white coat, but still not having the next coat in sight. Such specimens on close examination will be found to have a very fine coat of the new hair, but so short as not to be perceptible except on close examination, still showing the exact location and distribution of the dark and light markings; the *skin* at this time is very black, and often much scratched up, probably by the mother in trying to make the young one shift for itself. I often examined the stomachs of young as well as adults, but till after they had begun shedding the white coat, and were, in all probability, 25 to 30 days old, I found nothing but the mother's milk. After they begin to shift for themselves, their food, for a time at least, consists of *Gammari* of different species.

Before the young shed the white coat, they are from 23 to 36 inches from the nose to end of flippers; the average the season through, from a good series of measurements, was about 30 inches. They are very variable in color; some are pure white; others very white on the lower parts, but more or less dusky on back; others again are a fine straw-yellow, with the same dusky variation as in the white ones. The yellow is also variable in the intensity of shade. Rarely some are found that are quite dusky all over, especially on the head and back; these are generally small and scrawny individuals. The hair is also quite as variable in texture as in color. In some it is fine, long, and woolly (mostly in the pure white examples). In others it is straight or wavy, while

some have short and quite hispid hair. They weigh at birth from four to six and one-half pounds, but grow at an astounding rate, becoming exceedingly fat in a few days. The blubber on the young a few days old is almost white and thickly interspersed with blood-vessels; it is not fit to burn. There is usually but one young at a birth; still twins are not of rare occurrence, and one instance came under my observation where there were triplets, but they were small, and two of them would probably not have lived had they been born. The season for hunting the young at lat. 67° N. begins about the middle of March and continues until the latter part of April. The first two weeks of April are the most productive, as later the hair is apt to be very loose, and many even have large bare patches on them.

When the season fairly opens, the Eskimo hunter leaves the winter encampment with his family and dog-team for some favorite resort of this seal; he soon constructs his snow-hut, and is as well settled as if it had been his habitation for years, for the seals he catches bring him and his family food and fuel, and snow to melt water from is always plenty, so that his wants are easily supplied, and he is contented and happy.

The manner of hunting the young seal is to allow a dog to run on ahead of the hunter, but having a strong seal-skin line about his neck, which the Eskimo does not let go of. The dog scents the seal in its excavation, which could not have been detected from the outside by the eye, and the hunter, by a vigorous jump, breaks down the cover before the young seal can reach its atluk, and if he be successful enough to cut off its retreat, it becomes an easy prey; otherwise he must use his sealing-hook very quickly, or his game is gone. It sometimes happens that the hunter is unfortunate enough to jump the snow down directly over the hole, and gets a pretty thorough wetting. The women often take part in this kind of sealing, and many of them are quite expert. The children begin when they are four or five years old. The teeth and flippers of their first catch are saved as a trophy and worn about the little fellow's neck. The next year when he begins, this will give him good luck, they think.

There exists a considerable spirit of rivalry among the mothers as to whose offspring has done the best, size, &c., considered. This runs to such a high pitch that I have known some mothers to *catch* the seal, and then let her child *kill* it, so as to be able to swell the number of his captures.

Some of the Eskimo hunters belonging to the Florence brought as many as seventy at one load. They were kept frozen, and we almost lived on the meat during the season, and learned to like it very much.

Some of the hispid seals pup on the ice without any covering whatever. Six instances of this nature came under my observation, and they were all young animals. The young exposed in this manner almost always fall a prey to foxes and ravens before they are old enough to take care of themselves.

As the season advances and the young begin to shed their coats, the roof of their *igloo* is often, or perhaps always, broken down, and the mother and young can be seen on sunny days basking in the warm sunshine beside their atluk. The mother will take to the water when the hunter has approached within gunshot, and leave the young one to shift for itself, which generally ends in its staring leisurely at the hunter till suddenly it finds a hook in its side; a stout seal-skin line is then made fast to its hind flippers, and it is let into the atluk; it, of course, makes desperate efforts to free itself, and is very apt to attract the attention of the mother if she is anywhere in the vicinity. The Eskimo carefully watches the movements of the young one, and, as soon as the mother is observed, begins to haul in on the line. The old one follows nearer and nearer to the surface, till at last she crosses the hole at the proper depth, and the deadly harpoon is planted in her body, and she is quickly drawn out. If the mother has seen the hunter approaching the atluk, however, she will not even show herself. I have never known of an instance where they have attempted to defend their offspring from man. I once saw a raven trying to kill a young seal while the mother was making frantic but very awkward attempts to catch the bird in her mouth. When the young first assume the coat of the adults (about the time the ice begins to loosen), they seem possessed of a vast amount of curiosity, and while swimming near the land, as they almost always do, can be lured within gunshot by whistling or singing. They would often play about the schooner, diving underneath and coming up on the opposite side, apparently enjoying it hugely. They delight to swim among the pieces of floating ice in the quiet bays. The young and yearlings of this species are often found together in small bands. The adult females will average four feet and a half to the end of the flippers. Such specimens are probably from four to seven years old; the males are a little larger. There is great variation in the skulls, but the sexes can readily be distinguished by the skull alone, the males having a longer and narrower head, with the ridges more prominent.

It is only the adult males (called "tigak," stinker, by the Eskimo) that emit the horribly disagreeable, all-permeating, ever-penetrating odor that has suggested its specific name. It is so strong that one can smell an Eskimo some distance when he has been partaking of the flesh. They say it is more nourishing than the flesh of the females, and that a person can endure great fatigue after eating it. If one of these *tigak* comes in contact with any other seal meat, it will become so tainted as to be repulsive to an educated palate; even the atluk of the *tigak* can be detected by its odor.

There is sometimes caught a hairless variety of this seal that the Eskimo call "okitook." I have seen one such skin. It had a few fine curly hairs scattered over it, but they were very different in texture from the ordinary hair. I do not know if the specimen otherwise differed from the ordinary seal. The food of the adults consists largely of different species of crustaceans, and during winter especially they subsist to a considerable extent upon fish. I have found in them the remains of *Cottus scorpius*, *C. grœnlandicus*, *Gadus ogac* (commonly), and *Liparis vulgaris*. During the time the adults shed for nearly a month previous I could detect nothing but a few pebbles in their stomachs. They become poor at this time, and will sink when shot in the water. The milk is thick and rich, and is sometimes eaten by the natives. The excrement looks like pale, thickly clotted blood.

There are sometimes found albinos, of which the Eskimo tell marvelous stories, one being that when they rise to breathe in their atluks they come stern first, and, in fact, they think such animals have their breathing apparatus on the posterior end of the body. I imagine this originated from a native once harpooning an albino in its atluk and finding his harpoon fastened in one of the hind flippers.

Toward spring, when the sun is shining brightly, these seals can be seen in all directions basking on the ice. They are to all appearance asleep, but manage to wake up regularly every few minutes to make sure that there is no danger about. At this season it is a favorite method of the Eskimo to hunt them by crawling flat on his belly toward the seal, and when discovered to imitate the movements of the animal, and to advance only when the seal looks in the opposite direction. In this manner they often approach so close as to be able to push them away from their atluks. This seal is of some commercial importance. The Scotch whalers often buy from the natives during the winter a thousand skins. These are brought with the blubber, and often cost the pur-

chaser not over 3 to 7 cents, and this mostly in tobacco, trinkets, or ship stores. To encourage them to procure more skins, they are furnished with a cheap *breech*-loading gun and a few hundred cartridges, which they soon waste, and then their guns are of course worthless. At the rate both young and adults are slaughtered at the present day, they will soon become so scarce that there will not be enough to supply the wants of the natives.

11. Pagophilus grœnlandicus, (Müll.) Gray.

"Kiolik," Cumberland Eskimo.

The saddle-back is of frequent occurrence about the southern waters of Cumberland Sound in spring and autumn. It is rather rarely found singly, but generally in considerable schools. They are even occasionally found as far up the sound as Annanactook, but mostly the young. Their procreation is unknown to the Cumberland Eskimo. A few schools were noticed at different times during September, 1877, and October, 1878, from the islands off the middle Labrador coast to Cumberland, at times at considerable distances from land. Every Eskimo who can secure it will have an adult male kiolik skin on the back of his toopik. The skins are here never used for clothing, the hair being too short and thin. They disappear from Cumberland when the ice makes, and return again in spring with open water, but stay only a short time. The flesh is much inferior to the netsick.

12. Phoca barbata, O. Fab.

"Ogjook," Cumberland Eskimo; "Oo-sook," Greenlanders.

This seal was first noticed a little to the southward of Cape Chidly, and thence northward to our winter harbor in about lat. 67° N. According to the Eskimo they are the most common about Cape Mercy, Nugumeute, and the southern Cumberland waters, where they remain the year around, if there is open water. They remain in the sound only during the time there is open water, as they have no atluk.

On the west coast of Davis Straits they are not rare, but are said by whalemen to diminish in numbers above lat. 75° N. They appear to be more common on the southern shores of the west coast of Davis Straits than on the northern, so that the natives go southward some distance to secure the skins. Was noticed among the pack-ice in Davis Straits in July and August.

The ogjook delights in basking upon pieces of floating ice, and generally keeps well out at sea. I have never seen any numbers together, but almost always singly. The old males do not seem to agree well, and

often have severe battles on the ice-floes when they meet. They use the fore flippers, instead of the teeth, in fighting.

In Cumberland they begin working northward as fast as the floe edge of the ice breaks up, arriving in the vicinity of Annanactook about the latter days of June. In autumn they move southward as fast as the ice makes across the sound, always keeping in open water. They are seldom found in the smaller fjords or bays, but delight in wide expanses of water. They dive to great depths after their food, which is almost entirely *crustacea*, mollusks, and even clams of considerable size. This seal has a habit of turning a summersault when about to dive, especially when fired at; this peculiarity, which is not shared by any other species that I have seen, is a characteristic by which it may be distinguished at a considerable distance. During May and June they crawl out upon an ice-floe, to bask and sleep; at such times they are easily approached by the Eskimo in their kyacks and killed. An adult will often measure ten feet between the two extremes. The color is variable; the tawniness more or less clouded with lighter or darker markings irregularily dispersed. By July some of them become almost naked. At this season their stomachs contained nothing but stones; some of them nearly of a quarter pound weight. They seem to eat nothing during the entire time of shedding, probably six weeks. Certain it is they lose all their blubber, and by the middle of July have nothing but "whitehorse," a tough, white, somewhat cartilaginous substance, in place of blubber. At this season they sink when shot. Some specimens were procured that had scarcely any teeth at all, and in many adults the teeth can almost be plucked out with the fingers. The young are born upon pieces of floating ice, without any covering of snow. The season of procreation is during the fore part of May. After the young have shed their first woolly coat (which they do in a few days), they have a very beautiful steel-blue hair, but generally so clouded over with irregularly dispersed patches of white that its beauty is spoiled.

A fœtus was procured near the Middliejuacktwack Islands April 28. Its extreme length was four feet seven inches.

	Inches.
Length of head	$8\frac{3}{10}$
Width of muzzle	4.5
Width of fore flipper	4.3
Length of fore flipper to end of nails	$7\frac{3}{10}$
Greatest expanse of hind flipper	13.5
Length of hind flipper	12
From end of nose to eye	3.2
Distance between eyes	3.50

Color uniform grizzly mouse-color, with a tinge of olive-gray. Muzzle, crown, and irregular patches on back and fore flippers white. From nose to eyes a black line crossing the head back of the eyes, forming a perfect cross. Nails horn-blue, tipped with white. Iris dark brown. Nose black. Muzzle wide; lips full and fleshy, giving the animal a bull-dog expression. Body long and slender. Beard pellucid, abundant, white, stout, the bristles growing shorter from the eye toward the nostrils. Hind flippers large and heavy, looking disproportionate. The hair rather short, but fine and somewhat woolly. There was interspersed another kind of hair, stiff and of a steel-blue; the next coat, I take it. The Eskimo are firm in the belief that the ogjook sheds its first coat within the uterus of the mother. In this instance there was certainly plenty of loose hair in the uterus; but the specimen had been dragged some miles in its envelope over the rough ice, and banged around considerably, besides having been kept three or four days in an Eskimo igloo among a heap of decaying garbage, so it is not to be wondered at if the hair was loose. There was little blubber on the specimen, and this was thickly interspersed with blood-vessels. The intestines toward the anus were filled with dung. The kidneys were very large, the heart remarkably so. The cartilaginous prolongation of the thorax, so prominent in *Pagomys fœtidus*, is wanting in this species.

The ogjook is of great value to the Eskimo, who prize the skins very highly. All their harnesses, sealing-lines, &c., are made from the raw skins; besides this, they make the soles of their boots, and sometimes other portions of their dress, from the skin. In such localities as the whalemen do not visit, and the natives are obliged to construct skin boats, this seal is in great demand. It takes fifteen skins for an ominak, or skin boat, and these skins require renewing very often. The skin of the back and belly dries unevenly, so the Eskimo skin the animal by cutting it longitudinally along both sides, and drying the skin of the upper and lower parts separately. It is a prevalent belief among whalemen that seals' livers, and more especially those of this species, are poisonous; but I am inclined to rate this as imagination. We ate the livers of all species we procured without any bad effects.

13. Trichechus rosmarus, Linné.

"Awouk" and "Ivik," Cumberland Eskimo.

The walrus is quite common about Cape Mercy and the southern waters of Cumberland, but at the present day rarely strays far up the sound. Their remains, however, are by no means rare, even in the Greater King-

wah, and many of the old Eskimo hut foundations contain the remains of this animal. The Eskimo say they got mad and left; certain it is they are found around Annanactook only as stragglers at the present day. Considerable numbers were observed on pieces of floating ice near Cape Mercy in July. About Nugumeute they are largely hunted by the Eskimo living there. The Eskimo say the tusks of the male always bend outward toward the tips, while those of the female bend inward.

14. Cistophora cristata, (Erxleb.) Nilss.

The bladder-nose appears to be very rare in the upper Cumberland waters. One specimen was procured at Annanactook in autumn, the only one I saw. The Eskimo had no name for it, and said they had not seen it before. I afterward learned that they are occasionally taken about the Kikkerton Islands in spring and autumn. I found their remains in the old kitchenmiddens at Kingwah. A good many individuals were noticed among the pack-ice in Davis Straits in July.

CETACEA.

1. Balæna mysticetus, Linné.

"Akbik," Cumberland Eskimo.

Also called "Pumah." I think the word had its origin in this wise. When whalemen first began to cruise in these waters, few, if any of them, had a knowledge of the Eskimo language, and, to make the natives understand what they were after, imitated the spouting of the whale by blowing. This was soon taken up by the Eskimo as the "codlunak" (white man's) word for whale, and soon came into general usage, and thus one of the first words was made that now constitutes a part of the pigeon-English of the whalemen's jargon.

The Cumberland Sound, or Hogarth Sound of Penny (Northumberland Inlet of Wareham in 1841), has been renowned among Scotch and American whalemen for more than a quarter of a century as a favorite resort of the right whale, and one of the most profitable whaling stations on the globe. But this locality, like all others, has been so thoroughly hunted nearly every season for a number of years that it no longer sustains its pristine renown as a profitable whaling ground.

So many ships were sometimes found here at one time that there arose a great spirit of strife among the crews as to which vessel would procure the most whales, and as a consequence whales were struck when there was but the slightest chance of securing them, and the line had to be cut to set them free. Such whales in all probability die, but not before

they have succeeded in permanently frightening others, which, instead of seeking the upper waters of the sound for a few weeks' quiet feeding, strike out and are seen no more.

Instead of allowing these animals to go up the sound, and find their favorite feeding grounds, they are attacked and chased as soon as they show themselves at the mouth of the sound. In fact, they have been so persistently persecuted that now very few pass up above Niantilic or the Kikkerton Islands.

The fall whaling begins late in September and continues till the ice makes across the sound. The whaling at this season is attended with great danger and hardships to the crews, and it is while prosecuting this fall "fishing" that the foundation to many a stubborn case of scurvy is laid.

The spring whaling begins generally in March or April, and continues along the floe edge until July, when the ice has left the sound.

The Eskimo from the southern part of the sound and along the coast from Nugumeute to Hudson's Straits report whales as found in those localities all winter; it is then quite probable that they reproduce on these coasts during the latter part of winter.

According to Eskimo tradition, these animals were once very abundant in the Cumberland waters, and their remains now bleaching on the rocky shores faithfully testify to this fact.

Of late years, whalers frequenting Cumberland Sound have been in the habit of employing natives to catch whales, supplying them with boats and all necessary equipments. It is needless to say that they are more successful than the whites in this hunt.

With their own primitive gear, the Eskimo seldom attacked a large whale; but yearlings were frequently caught. I was presented with a harpoon-head by the captain of a Peterhead whaler, that had been taken out of a very large whale caught near the Kikkerton Islands; it was imbedded in the *muscles*, so that the whale must have been struck while it was quite small in order that the harpoon should have pierced through the blubber. The weapon is, moreover, of a pattern which the Eskimo I showed it to say they never saw before; but I must confess I can see but a very slight difference in it from those in use at the present day.

The "black skin," called "muktuk" by the natives, is considered as a great delicacy; when they have not eaten of this food for some time, and then get an opportunity to indulge to their heart's content, they eat till they can hardly move.

2. Physalis antiquorum, Gray.

Razor-back of whalers.

I cannot positively assert that the razor-back frequents the Cumberland waters to any great extent; in fact, I somewhat doubt if it does, one reason being possibly the scarcity of fish. I have seen it north of Hudson's Straits and about Cape Mercy, as well as on the Greenland coast in Disko Bay.

3. Megaptera longimana Gray.

Hump-back of whalers.

I could not ascertain that this whale is common in Cumberland at any season. It frequents the southern waters, but is little troubled by the whalers. The Eskimo do not seem to have a very clear idea of it.

4. Orca gladiator, (Bonn.) Sund.

"Killer" of whalers.

The killer is a very common whale in the Cumberland waters. They arrive with the white whales, which they follow up the fjords. Many thrilling stories are told by the Eskimo as well as whalemen of desperate fights between this animal and other whales. The Eskimo are rather afraid of it, especially the solitary kyacker. I have known the white whales to come in close proximity to the ship and lie along her sides, when they were pursued by these voracious sea-wolves.

5. Phocæna communis, Brooks.

The porpoise is by no means rare, especially in the southern waters during spring and autumn. I neither saw nor heard of them in the vicinity of Annanactook.

6. Beluga catodon, (Linné) Gray.

White fish, or White whale, of whalers. "Killeluak," Cumberland Eskimo.

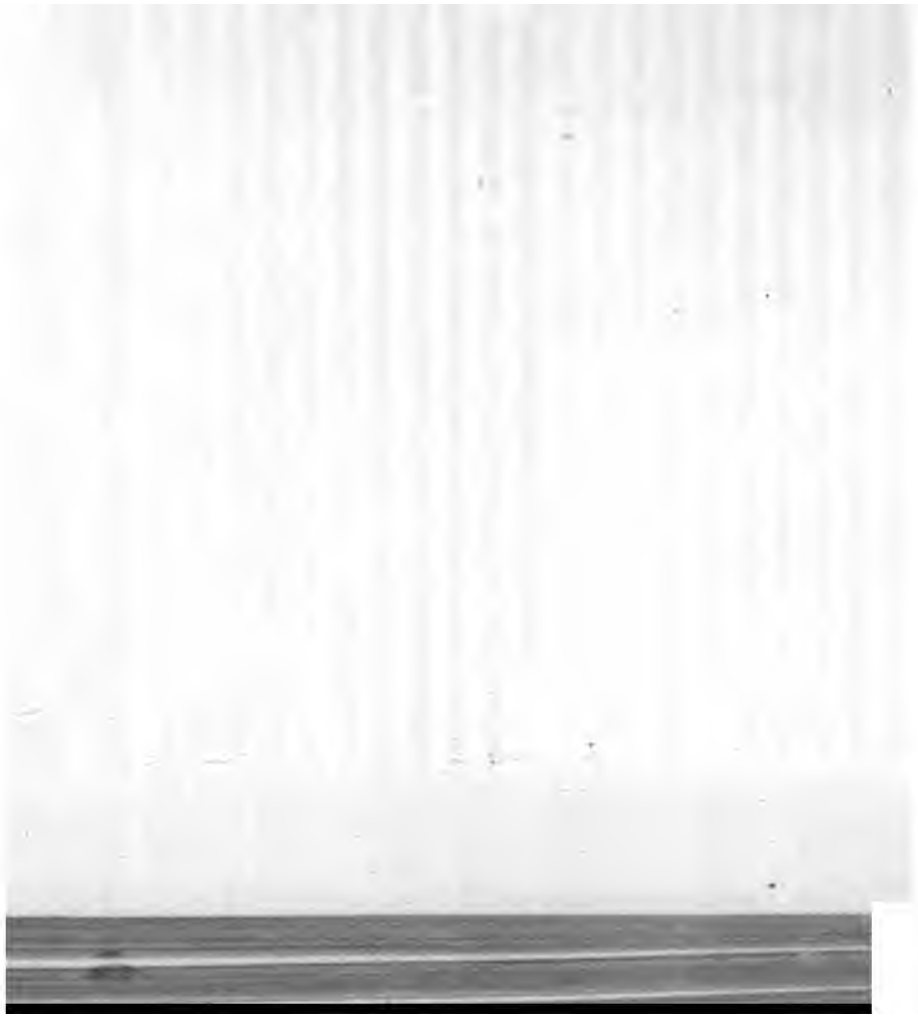
The white whales begin to work up the sound as soon as the ice begins to loosen. They become very abundant, especially in the Great Kingwah Fjord. In July many hundreds repair to the sand-beaches of this fjord, and some whalers have attempted to catch them in nets, but with indifferent success. They are sometimes driven up into shallow water at flood tide, and by the receding of the water many are left high and dry. It is a question of interest what they go into this fjord after. It is not to have their young, as they are already with the mothers; nor does it seem to be after food, as little or nothing is found in their stomachs at this time. One thing I noticed, when they go up the fjord they have a ragged appearance and dirty color, and, according to some whalemen,

are covered with parasites; but after they have been rolling and rubbing themselves on the sand-beaches for a few days they look much smoother and their color is a creamy white. The Eskimo say the males and females keep separate, but I do not think there is much truth in this statement. Some think they go on these shoals to avoid the attacks of the killers, which play sad havoc among them outside, but do not follow them into shallow water; but if this were the reason, they would take refuge in any small bay or inlet, and not choose this particular fjord year after year. I found no external parasites, but the internal ear cavity was nearly filled with worm-like animals nearly two inches long. They were firmly attached by one end, and stood erect, having somewhat the appearance of very coarse hairs. While migrating into the sound they always keep just at the floe edge, and if the ice is broken do not seem to like getting among it. In the winter of 1876–77, a couple got belated and froze up in the Kingwah tide rifts. They were harpooned by the Eskimo in January. A considerable number of these whales are caught by the Eskimo from their kyacks.

7. Monodon monoceros, Linné.

Narwhal of whalemen. "Killeluaksuak," Eskimo.

By no means abundant, but of regular occurrence in spring and autumn. These whales give the Eskimo much trouble to capture, on account of their agility. The horn is often used for the handle of the harpoon, and for various other purposes where wood is scarce.



BIRDS.

By Ludwig Kumlien.

The following list is of necessity fragmentary and very incomplete from various reasons. In the first place, the expedition did not arrive at the proposed winter-quarters until October, when the weather had become so inclement that most of the birds had gone southward. During the brief stops that were made at different harbors in the autumn of 1877, I was often obliged to remain on shipboard for want of a boat, instead of cruising about, as I would otherwise have done. Of course I often went out with the Eskimo; but as they were looking for whales and seals, I got only such birds as accidentally came in our way. In the spring, the schooner was under weigh before the birds had fairly begun nesting. The last three weeks of our sojourn in the winter harbor I was prevented from making any explorations, except in the immediate vicinity of the harbor, on account of the ice, which was driven northward by the long-continued southerly gales. This ice formed so perfect a barrier about us that we could not get out of the harbor, and to have ventured among it with a boat when the strong currents were whirling and crashing it in every direction would have been a piece of foolhardiness that could but have resulted disastrously.

There is no point on either side of Cumberland Gulf or Sound that is less suitable for a naturalist than was Annanactook Harbor. It is formed by a cluster of small rocky islands, the outermost of a large group lying between the Greater and Lesser Kingwah Fjords. The nearest point to the mainland from the harbor was about nine miles. There were extensive valleys, with large grassy flats and sandy beaches, much frequented by different kinds of birds, both for feeding and breeding grounds.

When the season was so far advanced that these places became the resorts of birds, I seldom got an opportunity to go on a cruise, for with the inclemency of the weather, the uncertainty of procuring a boat, and the treacherous condition of the ice, it was almost sure that one or the

other of these drawbacks would indefinitely postpone a contemplated journey. At this time I had the use of but one hand, and could not manage a kyack.

All the islands in the vicinity of Annanactook are rocky—solid rock, in fact—with extremely scanty vegetation. The shores are generally steep bluffs, and very little beach is exposed at low tide. A few miles up the Greater Kingwah, however, are very extensive beaches, and thither all the waders congregated as soon as the ice began to loosen from the shores. After leaving our winter harbor, the Florence made brief stops at different points, but for such short periods that it gave me very little time for explorations.

After our arrival on the Greenland coast I received very great assistance from Governor Edgar Fencker and lady, of Godhavn, through whose kindness I procured many valuable specimens. I can never forget the kindness and unbounded hospitality of this educated and refined gentleman and enthusiastic naturalist.

To Inspector Krärup Smitz and lady, of Godhavn, I am under very great obligations, not alone for the valuable donations of interesting Eskimo implements, but for their untiring zeal in making our sojourn as pleasant as possible, and the ready and entertaining information on many little known subjects pertaining to Arctic matters.

I was not a little surprised, as well as delighted, to find in Governor Fencker a person perfectly familiar with the birds of North America as well as Europe. During his eleven years' residence in Northern Greenland he has, of course, added much to the knowledge of Arctic ornithology, and I was pleased to learn that he contemplated giving the world the benefit of his observations in an illustrated work on the birds of Greenland. Such a work, embellished with his superb drawings, cannot fail to rank very high among the ornithological literature of the age.

I have not the least doubt that future explorations in Cumberland waters will yield a much richer harvest than I gathered. Many species will be added, especially if the Lake Kennedy region is visited in summer.

For the benefit of any future explorer who may visit this section of country I will give what appears to me the best route and manner of reaching Lake Kennedy. A person wintering in Cumberland will be very apt to be stationed either at Niantilic on the western shore, or the Kikkerton Islands on the eastern, a little farther to the north. These points are favorite resorts for Eskimo in winter, and hunting parties

leave both settlements for the interior every summer, so there would be no difficulty in securing Eskimo guides and assistants, who are absolutely necessary to the success of such an enterprise. Good strong dog-teams, to carry boats and all the required equipments, can be secured from the Eskimo, they driving their own teams.

The start should be made in May, and the course up the so-called "Mollu Keitook" fjord that opens into the gulf about forty miles north of the Kikkerton Islands on the western shore. This fjord can at this season be traveled with ease with sledges its entire distance—about ninety miles. During this stage of the journey the Eskimo could secure enough seal in the fjord for both man and beast. When the inland country was reached, reindeer would make a very acceptable substitute. But this supply should in no wise be solely depended upon. When the head of the fjord is reached there will be found a fresh-water stream, the eastern exit for the Kennedy Lake waters. This stream should be followed to the lake. If it be late in the season, a whale-boat may be taken up the stream with comparative ease. There are some places where the stream runs in narrow gorges, but the surrounding country offers suitable places for a portage over such points, into the numerous lake-like expansions that will be met with. If it be in May there will be found an abundance of snow for traveling with sledges on the land, and the comparatively level character of the country, which becomes more strikingly so as one nears the lake, will present but few obstacles to a good dog-team.

A light canvas tent should be a part of the equipment. While the snow lasted this could be inclosed within a wall of snow, and later be made very comfortable with a stone wall.

The lake abounds in numerous small islands, has sandy as well as grassy beaches, and is a favorite resort for myriads of waterfowl. It is so large that one cannot see across it. Its location is probably between the 66th and 67th parallels of north latitude. Salmon are abundant in its waters, and a seal that, from the skin, I could not distinguish from *Pagomys fœtidus*, abounds in considerable numbers. The vicinity is the favorite feeding-ground of immense herds of reindeer. Wolves and foxes are very numerous, and among the Eskimo there is mention of an animal that from their descriptions and drawings seems to be a *Gulo*.

Fossils (Silurian) seem to be very abundant, and petrifactions marvelously perfect abound in the lowlands. The surrounding country has much the general aspect of a high northern prairie, being quite flat and

sustaining a good growth of grass and plants. The ascent to the Cumberland coast on the east and the Fox Channel on the west is so gradual that it is hardly perceptible, the coast-line in both instances being precipitous. This is especially true of the western slope, where it is so gradual that it is with the greatest astonishment one suddenly finds himself on the summit of an enormous cliff, with the breakers of Fox Channel dashing on the rocks below him and an expanse of water stretching to the westward as far as the eye can reach.

The western outlet of the lake is larger than the eastern, and is said to empty through a deep gorge near Point McDonald.

A far less satisfactory time to go is after the breaking-up of the ice. There is no doubt it could be performed with less labor and fatigue at this time, but for the naturalist the best season would be over.

When the collections are ready, they can be safely cached till winter, and brought down in comparative safety on dog-sledges. A very interesting station for a naturalist would be near the mouth of the gulf, in the vicinity of the Kikkerton Islands; at this place there would be open water in April or May, and many valuable birds could be secured before they scatter over the country to breed. When the birds arrive at Annanactook, the season is already so far advanced that they immediately begin nesting. I have concluded to retain in the present list many species on very slight evidence in the hope that it may in some degree assist future explorers and put them on the lookout for some species that might otherwise escape their notice.

The birds do not congregate in large numbers on the islands in Cumberland to breed, the way they do to the southward and on the Greenland coast. There is an exception with *Somateria mollissima*. Some species that breed by myriads two hundred miles to the southward, and are equally numerous on the coast of Greenland to 73° N. lat., are found only as occasional stragglers in the Cumberland waters.

Some idea of the barrenness of the islands around Annanactook may be arrived at from the fact that from October to July *one hare* and *two ptarmigans* were brought in, and there were twelve Eskimo that hunted the greater part of the time, and I was out on every occasion when I thought it at all likely that such game could be procured. Scotch whalers have told me that near Nugumeute they have had as high as *two hundred ptarmigans* during the winter, and hares in abundance.

I have added the Eskimo names of the birds in such instances as I could do so with certainty. The Greenlanders' names are often quite

different from the Cumberland Sound Eskimo; these have also been added. These names will be of use to any one visiting this region not conversant with the Eskimo language.

1. Turdus aliciæ, Bd.

One specimen caught on shipboard off the coast of Newfoundland, October 22, 1878.

2. Saxicola œnanthe, Bechst.

Breeds along both shores of Cumberland and on the west coast of Davis Straits, but rare.

One of the commonest land birds on Disko Island, Greenland, and around Disko Bay, both on the islands and mainland. I showed specimens to Eskimo from Nugumeute and Frobisher Straits, and they instantly recognized them and said they breed there, but are not plenty.

3. Anthus ludovicianus, Bechst.

Kung-núk-took, Cumberland Eskimo.

The first specimens were seen in the spring at Annanactook Harbor on the 30th of May. There was no bare ground; but they frequented the tide-rifts at low water, searching after small marine animals.

It looked very strange to see this bird running about among the stones and *in* the water like a *Cinclus*. I examined the stomachs of specimens killed in these localities, and found them to contain *Gammarus*, *Lœmodipodia*, *Caprella*, and a few small *mollusks!* There can be no doubt that they were feeding on this food from necessity, and not choice, for there was no bare ground and no insects at this time. During the first of June we had the severest snow-storm of the season, and I think most of them perished. They would come around the observatory and shelter themselves as best they could. They were so far reduced that they were easily caught with the hand.

In autumn they leave for the south about the middle of September. At this season, besides their diet of insects, they feed on the berries of *Empetrum nigrum* and *Vaccinium uliginosum*. During summer their food consists almost entirely of insects, largely of dipterous larvæ, which they procure among the *carices* around the fresh-water ponds. At Annanactook they began building about the 20th of June. The nest was always placed deep in a rock crevice, so far in, in fact, that I could not secure any of the nests I found. On the Greenland coast, especially in the vicinity of habitations, they often build in a tussock, much like a sparrow; but there the ravens are not so numerous or destructive to birds and eggs as in Cumberland.

They practice every artifice to decoy an intruder from the vicinity of the nest—shamming lameness, and uttering the most plaintive cries; flitting from crag to crag before the pursuer till they have led him far beyond the nest, when suddenly they seem to have recovered, and take longer flights, till at last they jump up very smartly and fly away apparently highly elated at the little ruse they have so successfully practiced.

This little bird is considered a great enemy by the Eskimo. They say it warns the reindeer of the approach of the hunter, and, still worse, will tell the reindeer if it be a very good shot that is in pursuit, that they may redouble their efforts to escape. The Eskimo never lose an opportunity to kill one of these birds. I have seen one with a rifle wasting his last balls in vain attempts to kill one when he knew that there was a herd of reindeer not more than a quarter of a mile away. They are generally distributed on both sides of Cumberland Sound and the west shores of Davis Straits to lat. 68° N. at least, but nowhere very abundant. Toward autumn they become more or less gregarious, and seem to migrate along the seashore.

4. Sitta carolinensis, L.

Caught on shipboard off the coast of Newfoundland October 22.

5. Dendrœca coronata, (L.) Gray.

A single example, an adult male, in Godhavn Harbor, Greenland, July 31, 1878.

6. Siurus nævius, (Bodd.) Coues.

Caught on board the Florence in Straits of Belle Isle, August 18.

7. Tachycineta bicolor, (Vieill.) Cab.

A couple of these swallows followed the schooner for two days in succession off Belle Isle, in August, 1877. Where were they during the night?

8. Pyrrhula ——?

July 19, 1879, while hunting among the mountains near Oosooadluin Harbor, in the northern waters of Cumberland, my attention was called by a bird whistling somewhat like *Ampelis garrulus*, but louder and clearer. I soon discovered it flitting among some small willows on the grassy ledges of a perpendicular cliff about 1,500 feet above tide-level. I could not scale the cliff, and had to content myself by watching it. It was apparently nesting among the willows, but kept continually just

out of range. At the time I pronounced it undoubtedly the female of *Pyrrhula europea*, which it resembled very much indeed, but now I incline to the belief that it was more likely the *male* of *Pyrrhula cassinii*, and that the female was sitting. I made a life-size drawing of it, and showed it to all the Eskimo in the vicinity. None could recognize it; but some said they had seen such a bird at Lake Kennedy, but that they were "tummumik abertook," all red. This may have been *Pitticola enucleator*, *Carpodacus purpureus*, or *Pyrrhula europea*, as I doubt not but the last species would be called "all red" by an Eskimo. The red part would certainly make the most lasting impression on his mind. I tried for some hours to procure this bird, but at last it flew over a ravine that I could not cross. I never got an opportunity to revisit the locality, and this interesting discovery had to be left unsettled. The bird was apparently *slate*-colored on the breast, the upper and lower tail-coverts conspicuously white, the top of head and throat much darker than the back. The flight was undulating. It kept whistling almost constantly, which led me to think it was a male bird.

9. Carpodacus purpureus, (Gm.) Gray.

During a dense fog, September 1, 1877, off Resolution Island, north of Hudson's Straits, one of these birds was caught on board the Florence. The Eskimo describe a bird about the size of the purple finch that occurs in the interior, and is "all red." Such information is, however, in no manner reliable, as "abertook" may be any color from umber to vermilion, and "all," especially when it comes to red, may be but a small part of the plumage.

10. Loxia leucoptera, (Wils.).

Caught on board the schooner in a fog off Bonne Bay, Newfoundland, August 15, 1877. Very common in the low pines at the head of Conception Bay, Newfoundland, October, 1878.

11. Ægiothus linaria, (L.) Cab.

"Anarak," Cumberland Eskimo. "Orpingmatook," Greenlanders.

Arrive in Cumberland as soon as the snow begins to disappear from the mountain sides. I found them about Niantilic and the Kikkerton Islands in September and October, but very few at our winter harbor. They are now common from Nugumeute to Hudson's Straits, and inland toward Lake Kennedy. Wherever there is a valley with any considerable vegetation, especially low willows, they are almost sure to be found. Observed abundantly on Disko Island, Greenland, where I found half-

fledged young in the last days of July. The nest here was built in small willows, like a *Chrysomitris*. Although they seemed to be migrating in October, I did not see any flocks, but only a few straggling individuals. They seem to wander from the land very often in fogs. I have counted a dozen or more in the rigging at one time from Hudson's Straits to Niantilic. Off Kikkertarsoak Islands, on the Labrador coast, as much as one hundred miles from land, these birds came aboard of the schooner in a gale. They were all young birds.

12. Ægiothus holbölli, Reinhdt.

A large linnet was caught in a thick fog in Grinnell Bay, September 3, 1877. It measured 6.25 inches in length. The specimen was "picked" by one of the ship's company while I went down into the cabin after my skinning tools. The body (without feathers) was preserved in alcohol, and Mr. Ridgway pronounces it *Æ. holbölli*. It was the only specimen I procured that differed in the least from a typical *linaria*.

13. Chrysomitris tristis, (L.) Bp.

An adult male caught on shipboard, August 22, 1877, off Cape Mugford, Labrador.

14. Plectrophanes nivalis, (L.) Meyer.

"Kopernúak," Cumberland Eskimo. "Kopanauarsuk," Greenlanders.

The first snowbird seen at our winter harbor was April 5, an adult male. The weather was quite severe, and there was no bare ground. It staid about the vessel some days, gleaning a scanty subsistence from the cook's rubbish pile. After this date I saw none until May 8. They then began to appear around the Eskimo encampments, and were in full song, and a very beautiful song they have. Never did I so enjoy a bird's song as I did their lively ditty after the long, silent, dreary winter. By the 13th five pair had arrived in the neighborhood, and the males seemed to try and outdo each other in their efforts to be musical. Such companions were they for me that I had no heart to destroy them, much as I wanted specimens in full plumage. The young Eskimo had no such scruples, however, and supplied me with specimens killed with their bows and arrows.

By the last days of May they had paired and chosen their breeding-places. The first eggs were procured June 20. The nests are very often in such deep fissures in the rocks that it is impossible to get at them. They are obliged to hide away their nests in this manner to escape the ravens. One of the most favorite positions for the nest is inside of an

Eskimo grave; *i. e.*, inside the stone cairn that they erect over the body. I have even seen a nest built *in an Eskimo cranium*. The nest is large and bulky, nearly the entire structure being composed of *Poa arctica* and other grasses, and invariably lined with feathers or hair. One nest, found July 11, that contained small young, was thickly lined with the hair of *Vulpes lagopus*. Some contain only feathers; others both hair and feathers. The number of eggs in all the nests I found was six. They present an almost endless variation in size and coloration, great difference being observable even in the same nest.

The snow bunting is generally distributed on both sides of Cumberland, but is nowhere abundant. Almost any locality is suitable, but I doubt if the food supply would be sufficient if they did not scatter well over the country. They are very common on Disko Island and around Disko Bay. Half-fledged young were taken near Godhavn August 2. The first plumage of the young is a uniform ashy gray. The food of the snowbird in summer consists largely of aquatic dipterous larvæ. For these they are constantly searching among the grass at the edges of fresh-water ponds. During the autumn they feed mostly on various kinds of seeds. They are very fond of the berries of *Empetrum nigrum* and *Vaccinium uliginosum*. As soon as the young are full-grown, they begin to congregate in small loose flocks, and move southward with the first snows of September. The young have by this time become lighter in plumage, and the russet wash begins to appear on the head and neck. They were often seen on board the schooner on the passage, at one time *two hundred miles* at sea, off Cape Chidly. There seems to be a striking difference in the size between Greenland and Alaskan specimens, the latter being the larger.

15. Plectrophanes lapponicus, (L.) Selby.

"Kióligak," Cumberland Eskimo. "Narksormutak," Greenlanders.

Not nearly so common as the preceding in Cumberland. In the autumn of 1877, I found a good many in the vicinity of Niantilic, but nowhere else; saw no males in the breeding plumage after September. During the summer of 1878, I procured one single specimen in June. I think they breed in the interior on the level land, and do not frequent the sea-coast so much as *P. nivalis*. I found them very common on Disko Island, and procured eggs and young in July and August. Their food at this time seemed to be entirely dipterous larvæ, for which they searched about fresh-water pools. In autumn they feed on seeds and berries. Many lit on the schooner during fogs and storms all the way

from Cape Chidly to Niantilic. According to the Eskimo they are more common than *nivalis* from Nugumeute southward and in the interior. There appears to be quite a marked difference in specimens from Greenland and from Alaska, and a comparison of a large series may give some interesting results. The Eskimo say they will eat *blubber* and *meat* if their food gets covered by snow. I have seen a specimen that was so covered with some oily substance that the feathers on the breast and belly were matted together. I am told by Nugumeute Eskimo that in summer the males "akapok amasuit" (talk a great deal). From this I infer that they are probably lively songsters during the breeding season.

16. Junco hyemalis, (L.) Scl.

Once obtained on shipboard off Belle Isle, October, 1878.

17. Scolocophagus ferrugineus, (Gm.) Sw.

Caught on shipboard during a gale off the north coast of Newfoundland, October, 1878.

18. Corvus corax, Linné.

"Tudlúak," Cumberland Eskimo. "Kernetook," Greenlanders; but also called "Tulluak."

The raven is extraordinarily common on both shores of Cumberland and on the eastern shore of the Penny Peninsula. In winter they congregate about the Eskimo encampments, where they can almost always get dead dog, if nothing more. All the specimens collected by me in Cumberland are of remarkable size, much larger than any I ever saw on the Greenland coast. The same was remarked by Governor Fencker, of Godhavn, who said he never could see any reason why the American raven should be called a variety of the European till he saw my specimens from the western coast of Davis Straits.

When the raven gets closely pressed by hunger, he will attack almost anything but man. Young reindeer fall an easy prey to them. When they attack a young deer, there are generally six or seven in company, and about one-half the number act as relays, so that the deer is given no rest. The eyes are the first parts attacked, and are generally speedily plucked out, when the poor animal will thrash and flounder about till it kills itself. In the capture of the young of *Pagomys fœtidus* they evince a considerable degree of intelligence. I have, on different occasions, witnessed them capture a young seal that lay basking in the sun near its hole. The first manœuvre of the ravens was to sail leisurely over the seal, gradually lowering with each circle, till at last one of them

suddenly dropped directly *into* the seal's hole, thus cutting off its retreat from the water. Its mate would then attack the seal, and endeavor to drag or drive it as far away from the hole as possible. The attacking raven seemed to *strike* the seal on the top of the head with its powerful bill, and thus break the tender skull. In two instances I allowed the combat to proceed until the seal was killed, and then drove the ravens away. I found no marks on the seal, except the blows on the head, which had fractured the skull in two places.

December 13, 1877, I witnessed a very amusing chase after a *Lepus glacialis*. There were two ravens, and they gave alternate chase to the hare. Sometimes the raven would catch the hare by the ears, and hare and raven would roll down the mountain side together thirty or forty feet, till the raven lost his hold, and then its companion would be on hand and renew the attack. They killed the hare in a short time, and immediately began devouring it.

They are extremely destructive to the eggs and young of all birds that have an open nest. They breed so early in the season that the young are fully fledged by the time the eiders begin laying, and the entire raven family then take up their abode on the duck islands, and gorge themselves with eggs and young. Nor is it only the eggs they eat, but their mischievous nature must out, and I have seen them drive the duck from her nest and deliberately break the eggs.

The Eskimo accuse the raven of warning the deer of the approach of the hunter by a peculiar croak not uttered at other times. This helps to add odium to their not over-enviable reputation. They are constant attendants of the Eskimo while seal-hunting. If the hunter procures more seal than he can take back with him, he will cover them with snow and return for them; but the operation has been watched by the black robbers from the neighboring cliffs, and a good number of them are soon made acquainted with the discovery, and as soon as the Eskimo is gone the seal is exhumed and soon reduced to the mere skeleton. I tried on several occasions to catch them by baiting a hook with a piece of meat, and carefully concealing the string in the snow. They took hold of the meat very cautiously, and lifted it till they saw the string, and then flew away in great haste.

During the winter, while making skeletons, I used to throw the refuse outside of the observatory; and I have repeatedly watched the ravens sit around and wait till I went to dinner, about 3.30 p. m. It was then, of course, quite dark; but as soon as I left the hut they came and got their meal, but were extremely cautious, often turning the pieces over

many times before they swallowed them, and even throwing and tossing them, to be sure that there was no trap about it. Some pieces that looked suspicious they would not eat, but walked around them and turned them over, but could not be convinced that there was not some trickery about them. I have often found them hunting about the observatory after some stray scraps, even on my return from dinner, when it was so dark that I could not see them but a few feet away. On moonlight nights I have known them to make visits to the rubbish pile outside our observatory; but such cases are rare, and only at the season when they cannot get any food without the greatest difficulty. At Annanactook Harbor they began building as early as March 20, but I saw some carrying pieces of skin and hair from the Eskimo encampments many days earlier than this, and when we had a temperature of -40° Fahr.

They nest only on the south side of the highest and most inaccessible cliffs, so the nest can seldom be reached. I examined one nest built on a little shelf of a high cliff. It was composed almost entirely of pieces of Eskimo skin clothing, among which were scattered the larger wing-bones of gulls, the larger primaries of several species of birds, twigs of salix, &c. The inside had a good lining of *Poa alpina*, and a considerable quantity of reindeer, fox, and dog hair, the whole presenting a very cozy appearance indeed. As soon as the seals begin to pup under the snow on the ice, they follow the foxes, which find the seal and drag them out. Now the ravens can fare well on the leavings. The Eskimo firmly believe that it does not hurt the ravens' eggs to freeze. They say the shell cracks, but the inner membrane is very thick and tough. I found that the Scotch whalers are also of this opinion, some positively asserting that they had known *frozen* ravens' eggs to hatch!

The young are full-fledged by the latter part of May. During the autumn months they feed largely on the berries of *Vaccinium uliginosum* and *Empetrum nigrum*. I have often observed them fishing at low tide among the stones. I killed a couple to ascertain the nature of the food they got. I found it to be *Cottus scorpius* and *Liparis vulgaris?*, with a few small crustaceans.

They are resident in Cumberland the entire year, but appear more numerous in winter, from their habit of staying about the Eskimo encampments.

The raven is considered as worse than useless by the Eskimo. They make no use of them except to wipe the blood and grease from their hands and face with the feathers.

19. Empidonax flaviventris, Bd.

Taken at sea off Cape Farewell, Greenland, September, 1878. This is, I think, the first recorded instance of its occurrence in Greenland.

20. Brachyotus palustris, (Bechst.) Gould

"Sutituk" (?), Greenlanders.

Apparently rare. Found breeding in the Kingnite Fjord in the Penny Peninsula; also in the Greater Kingwah. Probably will be found more common in the interior toward the southwest in Hall's Land, if it be the species described to me by Eskimo from there. They say it nests underneath an overhanging shelf of rock on or near the ground. Appears to be rare on the coast of Greenland. Is found as far north as 70° N. lat.

21. Nyctea scandiaca, (L.) Newt.

"Opigjúak," Cumberland Eskimo. "Opik" and "Opirksook," Greenlanders.

I was very much surprised not to find this owl more common. At the Kikkerton Islands and up Kingnite Fjord were the only localities where I met it on the west coast. From Hudson's Straits to Nugumeute, in Hall's Land, it is more common, probably on account of the greater abundance of hares and ptarmigans in this region. It probably breeds on the Hunde Islands in Disko Bay, and on the "islands" (the rocks projecting through the glacier) in the glacier on the mainland, to the eastward of Rittenbenck, Greenland. They are by no means strictly nocturnal. I have seen them chasing ptarmigan at midday in October, when the sun was shining brightly. I have seen them coursing along the shore at low tide, apparently *fishing;* but whether they were hunting for snipe or fish I am unable to say, as they were so shy that I could not get within rifle range of them. The primaries are highly prized by the Eskimo for their arrows. These birds migrate to the southward about the same time as the majority of the waterfowl.

22. Falco candicans, Gm.

"Kirksoveasuk," Greenlanders.

During the whole year's collecting on Cumberland Island I saw but one single specimen, late in November, 1877. He was beset by a large concourse of ravens that were teasing him, as the jays do hawks and owls at home. According to the Cumberland Eskimo, they are very rare, and seldom seen except in winter. Many do not know them at all. On Disko Island, especially in the Godhavn district, they are common and resident. These hawks seem to prefer nesting in the vicinity of "bird rocks," where they can procure plenty of birds with very little

trouble. In winter they subsist wholly on ptarmigans and hares. Governor Fencker, during his long residence in Northern Greenland, has had good opportunities for studying this bird, and he thinks there is but one species inhabiting the country, having known of instances where the parents of a nest represented the two extremes of plumage. Nor does the difference seem to be sexual, seasonal, or altogether dependent upon age, but more probably partaking of that remarkable phenomenon familiar in *Scops asio*.

During my frequent excursions about Disko Island I often had an opportunity of witnessing this hawk preying upon jaegers, kittiwakes, &c., but was surprised that they are not possessed of swifter flight. A duck hawk would have made a short job of catching a kittiwake that one of these hawks followed till he fairly tired the bird out. Their success seems to depend more upon a stubborn perseverance than alacrity of flight. The flesh of the young birds is by no means despicable food, and is highly prized by the Danish colonists.

23. Falco communis, Gm.

A regular breeder in Cumberland. Usually found about the Eider Islands. Procured nearly full-fledged young in August that were taken from the nest on a high cliff in the Greater Kingwah Fjord.

24. Astur atricapillus, (Wils.) Jard.

A single specimen, at Niantilic, September 19, 1877.

25. Haliaëtus albicilla, Linné.

"Netkoralik," Greenlanders.

I saw this eagle at American Harbor, in October, 1877, at two different times. In the spring of 1878 I often noticed a pair that finally built a nest on a high but not inaccessible cliff in Kingwah Fjord. I could have shot the birds, but waited until I should be able to procure the eggs, and then get the birds. Unfortunately the wind set in from the south, and I could not get near the place on account of ice till the Florence set sail for the Greenland coast. Enough was ascertained, however, to show that this bird *does* breed on the western shores of Davis Straits, although probably sparingly. On the coast of Greenland it is by no means uncommon. Eggs were procured from Claushavn through the kindness of Governor E. Fencker.

26. Lagopus albus, (Gmel.) Aud.

"Akagik" (both species), Cumberland Eskimo.

Very few ptarmigan were found about our winter harbor; but, from the Eskimo accounts, they are quite common in the larger valleys, where

there is a ranker growth of willows. The stomachs of those I examined of this species contained willow buds and small twigs. From Nugumeute southward and westward in the interior they are abundant according to the Eskimo stories, but which species is of course impossible to say. They begin to change color as soon as the snow commences to melt, in lat. 67° N. about the middle of May. This change in plumage is more tardy as one goes farther north. I was informed by intelligent Greenlanders that north of Upernavik, near the glacier, they had found ptarmigans nesting, and that the male was in perfect winter plumage. This was probably *L. rupestris*. If this be true, it is possible that in sections where much snow remains during the summer the change is very late, or, perhaps, does not occur at all.

27. Lagopus rupestris, (Gmel.) Leach.

"Akagik," Cumberland Eskimo. "Akeiksek," Greenlanders.

I am unable to throw any light on the distribution of these birds in Cumberland, as I was unable to procure but a single specimen of this species and two of the preceding. The crop was crammed full of sphagnum moss.

28. Ægialitis semipalmata, (Bp.) Cab.

"Koodlukkáleak," Cumberland Eskimo.

Arrived at Annanactook about the middle of June. By no means rare. Breeds on the mossy banks of fresh-water ponds along both the Kingwah Fjords, as well as other localities in Cumberland. It seems remarkable that the Cumberland Eskimo should discriminate between this and the following species, when they confound all the larger gulls under one name. They told me that *Æ. hiaticula* was larger, flew faster, and had a stronger voice than *semipalmatus!!* All of which is true. The condition of the ice at the time these birds were nesting kept me from visiting their breeding-grounds, although but a few miles away. They migrate southward as soon as the fresh water is frozen.

29. Ægialitis hiaticula, (L.)

"Tukagvajok," Greenlanders.

I am not aware that this species has hitherto been introduced into the North American fauna, though long known as a common bird on the Greenland coast, where *Æ. semipalmata* is rare. It is apparently more common than the preceding in Cumberland. Arrives about the same time, and breeds in similar localities. Very common about Disko Island, Greenland, where young birds were procured. This bird is readily distinguishable from *Æ. semipalmata* by its greater size and more

robust form, in having a white patch above and behind the eye, and much wider pectoral band; it will also be found that only the outer and middle toes are united by a web.

30. Strepsilas interpres, (L.) Ill.

"Telligvak," Greenlanders.

Common about Disko Bay, Greenland, and northward to 73° N. lat. at least. Breeds on the Green, Hunde, and Whale Islands in Disko Bay. They nest among the *Sterna arctica*, and it is impossible to distinguish between the eggs of the two species. Not observed in Cumberland Sound, nor on the east coast of the Penny Peninsula; still, the bird was instantly recognized by the Cumberland Eskimo, when they saw it on the Greenland coast, and they had the same name for it as the Greenlanders.

31. Recurvirostris americana, Gm.

I enter this bird on my list on Eskimo authority,—poor authority, it is true, but I have in my possession a drawing, made by a wild Eskimo, that is so unmistakably this bird that I do not hesitate to accept it, especially when he gave me a perfect description, and that without any attempt on my part to draw him out. He says he saw them for the first time in the summer of 1877, while reindeer hunting, south of Lake Kennedy.

32. Lobipes hyperboreus, (L.) Cuv.

"Shatgak," Cumberland Eskimo.

Arrives in Cumberland in June. Large flocks were repeatedly seen going to and coming from their breeding-grounds in Kingwah Fjord. Not nearly so common in Cumberland as the following species. The remarks on the habits of *P. fulicarius* as observed by me will apply to this species only in part. I have seen them as far south and farther north, and nearly as far from land, as the following species, but only a few individuals. They seem to prefer the shore more, are often noticed running about on the ice-cakes, and when they see anything in the water they want jump in after it. Breed plentifully on the islands in Disko Bay and around Upernavik; on these islands they nest among *Sterna macrura*, on the rocks; in Cumberland, around fresh-water ponds, on grassy banks. They are apparently less gregarious than *P. fulicarius*, and prefer the smaller bays to the more open and boisterous waters. I have often seen a whole flock alight on the drift-ice and feed by jumping into the water after the food when seen; but *fulicarius* would have lit *in* the water in the first place. Eggs were procured on the Green Islands in Disko Bay.

33. Phalaropus fulicarius, (L.) Bp.

"Shatgak," Cumberland Eskimo. "Whale-bird," or "Bowhead Bird," of whalemen.

These birds were met with at great distances from land. The first seen on our outward passage was on August 4, 1877, in lat. 41° N., long. 68° W.; here large flocks were met with. As we proceeded northward, their numbers increased till we reached Grinnell Bay. Off the Amitook Islands, on the Labrador coast, two hundred miles from the nearest land, I saw very large flocks during a strong gale. Hardly a day passed but some were seen, either flying about in a rapid and vigorous manner, often rising to a considerable height, and then suddenly darting off in the direction of a spouting whale, or swimming about with that grace so eminently characteristic of the phalaropes. They follow the whales, and, as soon as a whale is seen to blow, immediately start for him, as a quantity of marine animals are always brought to the surface.

Very few were seen north of Frobisher Straits, for the weather by this time had probably become too severe for them, and I think the birds seen on the passage were migrating southward. I am more inclined to think so, as the next year, in going over nearly the same route a month later, very few were seen. They arrive in Cumberland with the breaking-up of the ice, and from this time till they begin breeding are seldom seen on the shore, but cruise out in the sound. Whalemen always watch these birds while they are wheeling around high in the air in graceful and rapid circles, for they know that as soon as they sight a whale blowing they start for him, and from their elevated position they can of course discern one at a much greater distance than the men in the boat. I doubt if it be altogether the marine animals brought to the surface by the whale that they are after, for if the whale remains above the surface any length of time they always settle on his back and hunt parasites. One specimen was brought me by an Eskimo that he had killed on the back of an *Orca gladiator;* the œsophagus was fairly crammed with *Lærnodipodian crustaceans*, still alive, although the bird had been killed some hours; they looked to me like *Caprella phasma* and *Cyamus ceti*. According to the Eskimo who killed it, the birds were picking something from the whale's back. I have often seen them dart down among a school of *Delphinapterous leucas* and follow them as far as I could see. On one occasion a pair suddenly alighted astern of my boat, and were not three feet from me at times; they followed directly in the wake of the boat, and seemed so intent on picking up food that they

paid no attention whatever to us. They had probably mistaken the boat for a whale.

They are without doubt the most graceful of all birds on the water, so light and buoyant that they do not seem to touch the water. While swimming, they are continually nodding the head and turning from one side to the other. They have greater powers of flight than either *hyperboreus* or *wilsoni*, and fly much more swiftly. In Cumberland, as well as on the Greenland coast, they nest with *hyperboreus*.

Governor Fencker tells me they are not found as far north as *hyperboreus;* probably few breed above 75° N. lat. Are common on the outlying islands between Nugumeute and Hudson's Straits. About the entrance of Exeter Sound, on the east coast of Penny Peninsula, are some islands which the Eskimo call "Shatgak nuna"—Phalaropes land—so they are probably very common there.

When they begin nesting they live more on shore, and probably get their food along the beaches at low tide. There is great variation in plumage, even among the apparently adult birds, in spring. I think it quite probable that they do not attain their full plumage the first year.

34. Tringa minutilla, Vieill.

Noticed in Niantilic, September, 1877, and in Disko Fjord, Greenland, August, 1878.

35. Tringa fusicollis, Vieill.

Breeds in Kingwah and Kingnite Fjords, and probably in other suitable localities on both shores of Cumberland Sound. Considerable numbers were observed along the beach near Nuboyant, on the west shore, in July; they were in all probability breeding. We were cruising close to shore, but I could not land.

36. Tringa maritima, Brünn.

"Sigereak," Cumberland Eskimo. "Sarbarsook," Greenlanders.

The purple sandpiper is the first wader to arrive in spring and the last to leave in autumn. The 4th of June is the earliest date I met them at Annanactook; this was during a heavy snow-storm, and the earliest date possible that they could have found any of the rocks bare at low tide. The flock lit on the top of one of the small islands in the harbor, and sheltered themselves from the storm by creeping behind and underneath ledges of rocks; they then huddled together like a flock of quails in winter. I have often noticed the same habit with them in late autumn, while they were waiting for low tide. They remained in the vicinity of Annanactook till November,—as late as they could find any exposed

shore at low tide; were very common in all the localities that I visited on Cumberland Island. Saw a good many on the Greenland coast. It is said that some remain in the fjords of South Greenland all winter.

They seem completely devoid of fear, and can almost be caught with the hands. Although such lovers of the rocky sea-shore, they nest on the borders of fresh-water lakes. Hundreds were breeding a few miles from our winter harbor, but it was impossible to reach the mainland on account of the treacherous condition of the floating ice. The specimens collected by me on Cumberland Island differ so much from the Alaskan, that I conjecture the probability of a western variety when a series can be brought together for comparison.

By the latter days of June very few were to be seen on the sea-shore, they having gone inland to breed.

They appear very sociable, and when a large flock is together they keep up a lively twitter, by no means unpleasant. As the breeding season approaches, the males have a peculiar cry, resembling somewhat that of *Actiturus bartramius*, but lower and not so prolonged. When this note is uttered they assume a very dignified strut, and often raise the wings up over the back and slowly fold them again, like the upland plover. After the breeding season commences very few are seen on the sea-shore till the young are full-grown. They are somewhat crepuscular in their habits.

37. Tringa subarquata, (Gould) Temm.

Not uncommon in North Greenland. Eggs were procured at Christianshaab, Greenland, through the kindness of Governor Edgar Fencker. Not observed on any part of Cumberland that I visited.

38. Tringa canutus, Linné.

A small flock lit on the schooner's deck in November after the harbor was frozen over. Saw none in the spring or summer. Seem to be quite common in North Greenland, but probably do not nest south of lat. 70° N.

39. Calidris arenaria, Linn.

One small flock in September, 1877, at Niantilic; no specimens were procured.

40. Limosa hudsonica, (?) (Lath.) Sw.

Two godwits were seen near Cape Edwards, on the west coast of Cumberland Sound, in September, 1877, but I could not, with certainty, ascertain the species.

41. Totanus melanoleucus, (Gm.) Vieill.

A single specimen on Arctic Island, Cumberland Sound, September 14, 1877.

42. Numenius borealis, (Forst.) Lath.

A few flocks seen passing northward up Kingwah Fjord in June. One specimen procured. Not noticed in autumn. Well known to the Cumberland Eskimo.

43. Grus ——? (probably **fraterculus**).

Quite common in some localities. Breeds in Kingwah and Kingnite Fjords in Cumberland, in Exeter Sound, and Home Bay on the west coast of Davis Straits. Common, especially during spring, at Godhavn.

44. Cygnus ——?

Swans occasionally occur in the Southern Cumberland waters; but the species is uncertain, as I could not procure a specimen. Said to be of regular occurrence in the Lake Kennedy region.

45. Anser albifrons, var. **gambeli**, (Hart.) Coues.

Not observed in any numbers about our winter harbor, but undoubtedly occurs in abundance on the fresh-water lakes. This is probably the goose that the Eskimo take in such great numbers at Lake Kennedy, where they drive them towards the sea-coast while they are in moult. Are common on the Greenland coast to 72° N. lat., and probably much farther. Large flocks were met with on the pack-ice in the middle of Davis Straits, July 24, 25, and 26. Eggs were procured in the Godhaven district in Greenland. The skin of the breast is sometimes used by the Eskimo for under-garments.

46. Anser hyperboreus, Pall.

Appears to be rare and migratory in the Cumberland waters. Saw a few specimens in early spring and late autumn.

47. Branta hutchinsii, Sw.

A single specimen procured June 10 in Kingwah Fjord. The Eskimo who killed it said he has seen many to the southward of Nugumeute. Saw no Canada geese at any time during my stay.

48. Anas boschas, Linn.

"Kaertooluk," Greenlanders.

Not observed in Cumberland, and unknown to the Eskimo. Not rare on the Greenland coast as far north as Upernavik. The flesh of this duck on the coast of Greenland is scarcely fit to eat, being almost as rank as a loon's.

49. Bucephala ——?

Flocks of whistlers were observed on three occasions in May; but I could not with certainty identify the species, as none were killed. *B. islandica* is quite common in the Godhavn district on the coast of Greenland; breeds near Christianshaab.

50. Histrionicus torquatus, (Linn.) Bp.

"Tornauiartook," Greenlanders.

Three examples seen, and one killed at Annanactook. Not uncommon in the Godhavn district on the Greenland coast.

51. Harelda glacialis, (Linn.) Leach.

"Agingak," Cumberland Eskimo. "Aglek," Greenlanders.

Arrived at the head of Cumberland during the latter days of May. As soon as there was extensive open water they became quite numerous, and their loud and incessant cries could be heard at any hour out of the twenty-four. They nest on the small rocky islands, especially about the Greater Kingwah Fjord, but singly, and not in colonies. They are gregarious when they first arrive, but soon pair and scatter. Common on the whole Greenland coast, and breed far to the north. These ducks are the noisiest birds for their size I have ever met. During the breeding plumage, scarcely any two males can be found that are precisely alike.

52. Polysticta stelleri, (Pall.) Eyton.

A beautiful adult male was shot in Disko Fjord in August, 1878. The specimen is now in the collection of Governor Edgar Fencker of Godhavn. During the time we were blockaded by the ice-jam at Annanactook Harbor, in Cumberland, I saw three or four of these eiders. At one time a superb specimen sat for hours on a cake of ice but a short distance from the ship; but I could not reach it on account of the breaking ice. I watched him a long time with a good glass, and there is no question of its identity. In late autumn I saw some that I think were of this species.

53. Somateria mollissima, (Linn.) Leach.

"Metuk," Cumberland Eskimo. "Mettek" and "Amaulik," Greenlanders.

This eider is one of the commonest birds in Cumberland, and the only species that congregates together in any considerable numbers to breed. They are at all times gregarious. The old males separate from the females and young as soon as the breeding season is over, and assemble by themselves in large flocks. They also migrate southward much

earlier than the females and young. During the autumn of 1877 we procured about seventy of these birds; but not a single adult male was shot or even seen. They were met with in large flocks at sea off the outer islands on the east coast of Hall's Land; here I also remarked that they seemed to be all males. As soon as there is any open water they are found in spring; still they were not common at Annanactook till the latter days of May. Eskimos from the south reported them on the floe edge near Niantilic early in May, and I saw a few on an iceberg near the Middliejuacktwack Islands on the 30th of April. They can stand almost any temperature if they can find open water. I saw one adult male in the tide rifts of the Greater Kingwah in January. The day I saw him it was —50° F.; but he proved too lively for me. The Eskimo could have procured him on different occasions; but they had some superstitious notion regarding so unusual an occurrence, and would not kill it.

In the fall of 1877 I often found broods still unable to fly, though more than three-fourths grown, as late as the middle of October. Small flocks continued about the open tide-holes till November 17. At this date I killed six young males; the temperature was —7° Fah. They had at this time about fifty miles to the open water.

Their food in autumn consists almost entirely of mollusks. I have taken shells from the œsophagus more than two inches in length; from a single bird I have taken out forty-three shells, varying from one-sixteenth to two inches in length. The adult birds in spring did not seem to be quite so particular; in them I found almost all the common forms of marine invertebrates, and sometimes even a few fish (*Liparis*, and the young of *Cottus scorpius*).

By the first week of June they were abundant; enormous flocks would congregate on an ice-field and hold high carnival. I have watched such gatherings with a great deal of interest. When thus assembled, some old veteran would make himself conspicuous, and jabber away at a terrible rate, often silencing the greater portion of the rest, who appeared to listen for a short time, when the entire crowd would break out, each one apparently expressing his or her opinion on the subject. There always seemed to be the best of good feeling in those meetings, however, and all points were apparently settled to every one's satisfaction. I have often lain behind a rock on their breeding-islands and watched them for a long time. On one occasion we disturbed a large colony, and the ducks all left the nests. I sent my Eskimos away to another island,

while I remained behind to see how the ducks would act when they returned. As soon as the boat was gone they began to return to their nests, both males and females. It was very amusing to see a male alight beside a nest, and with a satisfied air settle himself down on the eggs, when suddenly a female would come to the same nest and inform him that he had made a mistake,—it was not his nest. He started up, looked blankly around, discovered his mistake, and with an awkward and very ludicrous bow, accompanied with some suitable explanation, I suppose, he waddled off in search of his own home, where he found his faithful mate installed. Now followed an explanation that seemed to be hugely enjoyed by all in the vicinity. A pretty lively conversation was kept up, probably on the purport of our visit, as they seemed much excited. I could spare no more time to watch them, and crept out from my hiding-place into full view of all, and a look of greater disgust and astonishment than these birds gave me is difficult to imagine; they evidently regarded such underhand work beneath the dignity of a human being, and probably rated me worse than a gull or raven. So sudden and unexpected was my appearance that many did not leave their nests, but hissed and squaked at me like geese; these same birds left their nests before when the boat was within a quarter of a mile of the island.

The first eggs were procured June 21. The islands on which they nest are but small barren rocks, of an acre or less in extent, and often but a few feet above high tide-mark. There are a few patches of *Poa arctica* and *Cochlearia officinalis* scattered about, and these contain the greater number of nests. Each nest has a little circle of green sod about it, which is manured every year and becomes quite luxuriant. These mounds are sometimes a foot high and as much in diameter, having been used as a nest for many years in succession. Very little repairing is necessary to fit the nest for the reception of the eggs,—merely a little grass or moss. But little down is used till the full complement of eggs is laid. The nests are often so close together that it is impossible to walk without stepping on them. A nest seldom contains more than five eggs, often three or four, and I never saw as many as six but twice.

The principal breeding-places in Cumberland are between lat. 66° and 67° N. The lower of these places is about ten miles off shore from Mallukeitu; the greatest number of birds nest here. The seven islands to the northward about twenty-five miles are favorite resorts; also the small islands to the SE. of Annanactook. There is also a group known

to the Eskimo as the "Shutook" Islands, in the Greater Kingwah, where I found them extremely abundant. In the Mallukeitu Fjord, according to the Eskimo, is another very much frequented breeding-place, but I did not visit it.

Thousands of eggs could be gathered on these rocks during the latter part of June and the first three weeks of July. It seems to me that it would pay whalemen to gather the down which can here be secured in great quantities. . The islands are so close together that they could all be worked within two days of each other. There are a great many immature birds, both male and female, that do not breed; they assemble in large flocks, and are often met with at considerable distances from land. I have found such flocks commonly in Cumberland, on the west coast of Davis Straits and Baffin's Bay, and on the Greenland coast abundantly. Many large flocks were seen in the middle of Davis Straits, among the pack-ice, in the latter part of July. During the first days of August I saw immense flocks of eiders on the western end of Disko Island, all males, flying southward. The specimens collected by me in Cumberland present certain striking and remarkable points of difference from specimens from the South Labrador and Newfoundland coasts, especially in the form and size of bill. I had prepared a series of skulls, selected from over two hundred birds, that was calculated to show the variation among them; but, unfortunately, they were among the specimens that I had to leave behind, in the unnecessary haste of our departure, of which I was given but a few hours' warning.

These ducks are of great use to the Eskimo; their eggs are eagerly sought after and devoured in astonishing quantities. The birds themselves constitute a good portion of their food at certain times, and the skins are used for a portion of their foot-gear in winter, and sometimes for clothing. We found the flesh of the young in autumn very acceptable indeed; but the adults in spring were rather rank. Some specimens were procured that weighed over five pounds. They become extremely fat by the end of June; and when an Eskimo can get a number, he will eat little else but the fat. I was often saved much labor by having them remove the fat from the skins, which they did with their teeth, and much more effectually than I could have done it with a knife. These birds suffer much from the depredations of gulls and ravens. *Larus glaucus* even nests among the ducks, and the ravens live off the eggs and ducklings the entire season.

54. Somateria spectabilis, (L.) Boie.

"Kingalalik," Cumberland Eskimo. "Siorakitsook" and "Kingalik," Greenlanders.

The king eiders were not noticed till the 20th of June. I saw a few large flocks at different times during spring; but there were a hundred *mollissima* to one *spectabilis*. They appear to keep by themselves, and not to mix with *mollissima*, at least during the breeding season. I never saw any on the eider islands. The Eskimo say that some years they are very plenty and others very few are found. One Eskimo told me that he once found them nesting in great numbers some distance up the Greater Kingwah, but not in company with the common eider. They arrive later and leave earlier than *mollissima*. In July I saw many of these ducks, males and females, about America Harbor. The sexual organs of those I procured were not developed, and they were all in the plumage of the female. I suspected them to be such birds as were thached very late the preceding season. Saw a great many in the same plumage on the west coast of Davis Straits and around Disko Island; many of the males seemed to be assuming the plumage of the adult. Governor Fencker told me that there were always a good number of these birds around in summer that did not breed. Many flocks of male birds were noticed west of Disko, all flying southward. Governor Fencker has procured identified eggs of this duck at Upernavik by shooting the parent on the nest. They are very common around Disko, but breed farther north. I shot a half-grown young in Kingwah Fjord in October, 1877. The lump of fat at the base of the bill of the adult males is esteemed a great delicacy with the Eskimo, and it is very seldom they bring one back that does not have this choice tit-bit removed.

55. Œdemia ——?

From the Middle Labrador coast north to lat. 67°, I saw at different times large scoters, but could not identify the species.

I will here make mention of a duck that I saw on two or three occasions. It seemed to have the size and general make-up of a scoter, but had much white on the scapulars and about the head. A duck was winged by one of the ship's officers; he said it had a white ring around the neck and the rest of the body was nearly all black. The bird that I saw was unknown to me; it may possibly have been the *Camptolæmus labradorius*. I find in my notes that the first one I saw was pronounced a partially albino scoter; but, seeing more just like it, I gave this theory up.

56. Mergus serrator, Linné.

"Pye," or "Pajk," Cumberland Eskimo and Greenlanders.

A regular breeder in Cumberland, but not very common. Nests on the perpendicular faces of high cliffs. Found on the Greenland coast to 73° N. lat. at least, and probably farther. Begins nesting in Cumberland about July 1.

57. Sula bassana, Briss.

Noticed at different times from Beaver Island, Nova Scotia, to lat. 65° N., most numerously in the Gulf of St. Lawrence and the South Labrador coast. Not observed in Cumberland.

58. Graculus carbo, Linné.

"Okaitsok," Cumberland Eskimo and Greenlanders.

A regular breeder in Cumberland; did not appear to be common, but the Eskimo say that some years they are quite plenty. The primaries were formerly in great demand for their arrows.

59. Buphagus skua, (Brünn.) Coues.

"Sea-hen" of whalemen.

One specimen procured at sea, lat. 41° N., long. 68° W., Atlantic Ocean. Others were seen at the time. Appears to be of frequent occurrence on the George's, Newfoundland, and Nova Scotian banks in winter. Seen near Lady Franklin Island, north of Hudson's Straits, in September; they then had young ones on the rocks.

60. Stercorarius pomatorhinus, (Temm.) Vieill.

"Ishungak," Cumberland Eskimo and Greenlanders.

These birds were first observed at Bonne Bay, Newfoundland, August 16. From this point northward to 71° N. they were common at nearly all points, and from Belle Isle to Hudson's Straits they were abundant. They nest about Nugumeute and Grinnell Bay, but not in Cumberland Sound. On the western shore of Davis Straits they are common, and nest at the mouth of Exeter Sound and at Shaumeer. I have, however, nowhere found them so very common as on the southern shores of Disko Island; at Laxbught and Fortuna Bay there must have been many hundred pairs nesting. Their breeding-place was an inaccessible cliff, about half a mile from the seashore. The greater number of the birds nesting here were in the plumage described in Dr. Coues's monograph of the Laridæ as the *nearly* adult plumage; but there were also a good many birds that were unicolored blackish brown all over, *but with the long vertically twisted tail-feathers.* That these were breeding I think there can be no doubt, as I saw them carrying food up to

the ledges on the cliff, for the young I suppose. They were very shy at Disko, and the greatest caution was required to shoot them. I shot none, even in full plumage, that did not have some white on at least one of the tarsi. They live to a great extent upon the labors of the kittiwake, though they do not hesitate to attack *Larus leucopterus* and even *glaucus*. They are destructive to young birds and eggs. It is a common sight to see five or six after one gull, which is soon made to disgorge, and then the jaegers fight among themselves for the morsel, which often gets lost in the *mêlée*. Eggs were procured at Claushavn, Greenland; the nest contained three eggs.

61. Stercorarius parasiticus, Brünn.

"Ishungak," Cumberland Eskimo and Greenlanders.

This species seems to have the same general distribution as the foregoing, but, so far as my observations went, far from as common. Eggs were obtained from the Waigat Straits. They do not breed in Cumberland Sound; in fact, I rarely saw one in the Cumberland waters. This species seems to depend on *Rissa tridactyla* for the greater part of its food.

62. Stercorarius buffoni, (Boie) Coues.

"Ishungak," Cumberland Eskimo and Greenlanders.

A very few of these birds visited the upper Cumberland waters in June, and soon disappeared. I doubt if they breed there. I saw but very few in all the localities I visited. Seems to be more common on the east than on the west coast of Davis Straits. One fine specimen was found dead on the ice, with a *wrought-iron nail* three inches in length in the œsophagus. The nail had probably fallen out of a whale-boat that had been dragged over the ice, and the bird had mistaken it for a fish. This species has probably the most northerly range of any of the jaegers. Breeds in the Waigat Straits and about Omenak on the Greenland coast. Said by the Eskimo to be the first to return in the spring. They certainly were the first to visit Annanactook.

63. Larus glaucus, Brünn.

"Nowgah," Cumberland Eskimo. "Naga," Greenlanders.

This gull is the first bird to arrive in spring. In 1878 they made their appearance in the Kingwah Fjord by the 20th of April. It was still about seventy miles to the floe edge and open water; still they seemed to fare very well on the young seals. Many are caught by them, and those partially devoured by foxes are carefully cleaned of every vestige of flesh. At this season, the Eskimo delight in capturing them in various ways. One of the most popular is to build a small snow-hut on the ice in a locality

frequented by the gulls. Some blubber or scraps of meat are exposed to view on the top, and seldom fails to induce the bird to alight on the roof of the structure. This is so thin that the Eskimo on the inside can readily see the bird through the snow, and with a quick grab will break through the snow and catch the bird by the legs. Some use a spear, thrusting it violently through the roof of the hut. Many are killed by exposing pieces of blubber among the hummocky ice and lying concealed within proper distance for bow and arrow practice.

By the middle of May they had become very abundant about Annanactook; still, there was no open water within fifty or sixty miles. These were all adults in full plumage; saw no immature birds till July. They settle on ice around the Eskimo encampments, and even on the rocks in close proximity to the huts. During this season they keep up an almost constant screaming at all hours of the day and night.

May 24, I noticed a couple of pairs building. I think this is the earliest date they would begin nidification at this latitude. June 4, I saw a few *L. glaucus* among a large flock of *Som. mollissima* that were diving for food outside the harbor in a small lead in the ice. As soon as the duck came to the surface, the gull attacked it till it disgorged something, which was immediately gobbled up by the gull. The gull picked several times at what was disgorged, which leads me to the belief that the food was small crustaceans. This piratical mode of living is very characteristic of *Larus glaucus*. At this season of the year there was so little open water in the vicinity that they would have had great difficulty in procuring any food therefrom themselves. I have taken the eggs by June 8, when there was more than a foot of newly fallen snow on the rocks; but the greater number do not nest within two weeks of this time.

A great many of these birds nest in Cumberland on what the Eskimo call "Nawyah nuna"—land of the Glaucous Gulls. This is an enormous cliff about one and one-half miles in length and over 2,000 feet in height, and nearly perpendicular. This cliff is about four miles from the seashore to the ENE. of America Harbor. Many hundreds of nests are scattered about on the little projecting shelves of rock, and the birds sitting on them look like little bunches of snow still unmelted on the cliff. The ascent to this locality is very laborious; but the marvelous beauty of the place will well repay any future explorer to visit it, for the plants that grow in such rich profusion at the base of the cliff, if nothing more.

This is the most common gull in Cumberland during the breeding season. I did not see any south of Resolution Island in September and

in October, but a very few as far south as the Kikkertarsoak Islands on the Labrador coast. They are far less common on the Greenland coast than *L. leucopterus*, while in Cumberland it is just the opposite. Eskimo from Cape Mercy tell me they are found all winter off the cape and about Shaumeer. A single specimen staid in the tide-rifts of the Greater Kingwah during the winter of 1877–78. In autumn they remain in the upper Cumberland waters as long as they continue open.

I have examined some nests that were built on the duck islands, always on the highest eminence; the structure seemed to have been used and added to for many years in succession, probably by the same pair. In shape they were pyramid-formed mounds, over four feet at the base and about one foot at the top, and nearly two and a half feet in height. They were composed of every conceivable object found in the vicinity, grass, sea-weed, moss, lichens, feathers, bones, skin, egg-shells, &c. The normal number of eggs is three, but often only two are found. Have taken the downy young in the latter part of June. I had an opportunity of seeing how these young hopefuls are instructed in egg-sucking. The parent carried a duck's egg to the nest and broke a hole in it, and the young one just helped himself at his leisure. After the young are full-fledged, these birds are eminently gregarious, and are often seen feeding in considerable flocks. The flesh is highly esteemed by the Eskimo; we found the young by no means despicable food.

The Eskimo use the skin with the feathers on for a part of their winter's foot-gear. They are extraordinarily greedy and voracious; nothing in the animal kingdom seems to come amiss to them. I have seen a half dozen tugging at an Eskimo dog skin; but this proved too much for them, though they made desperate attempts to get off some small pieces, which they would have eaten had they succeeded. Eggs, young or disabled birds, fish, and crustaceans are their common fare. They are also very fond of feeding upon seal carcasses. The first plumage of the young is much lighter than that of a yearling bird. This is just the opposite of *L. leucopterus*, they being the darkest when young. The young of *L. glaucus* gets darker in autumn, but when first fully fledged resembles more the bird of two years, except that there is no trace of blue on the mantle, and they have somewhat darker primaries.

64. Larus leucopterus, Faber.

"Nowyah," Cumberland Eskimo. "Nayangoak," Greenlanders.

The Eskimo do not distinguish between *L. glaucus*, *leucopterus*, *glaucescens*, and *argentatus;* they are all "nowyah"; in fact, I am led to

think it a sort of general term as they use it,—something like "gull." This species is far less common in Cumberland than *glaucus*. On the Greenland coast it is the most common gull, except *Rissa tridactyla*. My opportunities for studying *leucopterus* were not very extensive, and my conclusions may be too hasty; but still it is worth while for others that may get better opportunities, to observe if the following points of difference are constant:

First. *Leucopterus*, 24 inches or less; *glaucus*, 27 to 32 inches.

Second. Tarsus and toes of *leucopterus* in fully adult birds often *orange-red*, and not flesh-colored as in *glaucus*.

Third. Ring around the eye in *leucopterus* flesh-colored; in *glaucus*, reddish purple.

Fourth. Young of *glaucus* in first plumage as light as the bird of the second year; the young of *leucopterus* nearly as dark as the young of *glaucescens*. The bill is also weaker and thinner than in *glaucus*.

Governor Fencker says he has often had birds that answered nearly to the description of *L. hutchinsii*, but with chrome-yellow bill, with vermillion spot, and not flesh-colored, with dusky tip; these birds were always found to measure *less*, however, than the average *glaucus*, which is directly the opposite of my experience with *hutchinsii*. There may be a gradation between the two species as far as regards size; but the above cited points of difference have proved good so far as my observations have gone. They mix indiscriminately with *glaucus* at all times, but are always readily distinguishable by their smaller size. Eggs were procured at Claushavn, Greenland, which are indistinguishable from those of *glaucus* except in size. A fine specimen, a full-fledged young, was secured on the Hunde Islands, Disko Bay, that had *four feet*, the second pair growing out of the knee-joint in front.

65. Larus glaucescens, Licht.

"Nowyah," Cumberland Eskimo.

So far as I am aware this is the first instance on record of this bird being taken on the Atlantic coast. They are quite common in the upper Cumberland waters, where they breed. Arrived with the opening of the water and soon began nesting. The nest was placed on the shelving rocks on high cliffs. Two pairs nested very near our harbor; but the ravens tore the nest down and destroyed the eggs. Only a single well-identified egg was secured. This gull is unknown to Governor Fencker on the Greenland coast. They remained about the harbor a great deal, and were often observed making away with such scraps as

the cook had thrown overboard; were shy and difficult to shoot. Full-grown young of this species were shot in the first days of September; these were even darker than the young of *L. argentatus*, the primaries and tail being *very nearly black.*

66. Larus marinus, Linn.

"Nayardluk," Greenlanders.

Observed in Cumberland only in late autumn; cannot ascertain that they breed there; quite common on the Greenland coast form 63° to 70° N. lat. Abundant in October on the South Labrador coast and Newfoundland. Hundreds daily frequent St. John's Harbor, Newfoundland.

67. Larus argentatus, Brünn.

"Nowyah," Cumberland Eskimo.

Not uncommon in Cumberland, and breeds to lat. 67° N. A mere straggler on the Greenland coast. Specimen shot June 20 in Cumberland contained ova as large as buckshot.

68. Pagophila eburnea, Gm.

"Nayauarsuk," Greenlanders.

Very common in Kingwah Fjord and vicinity just before it froze up, for a few days only. None seen in spring. Does not breed in Cumberland. By no means common on the Greenland coast. The food of those I examined consisted of small crustaceans. I saw one trying to swallow the *wing* of a *Som. mollissima* that the cook had thrown overboard, when I shot it. The wing was so lodged in the œsophagus that it would certainly have choked the bird had it not disgorged. Those that visited our neighborhood seemed to have a very decided preference for meat. I once saw three or four alight on a seal that had just been killed, and attempt to get at the flesh. They are easily decoyed within shot by strewing pieces of meat on the ice. Were one of the most abundant and greedy birds around a whale carcass that had been killed in the vicinity. The specimens I procured that were nearly in adult plumage had a greenish yellow bill at base and bright yellow tip, with *no dusky markings;* the younger birds only had the bill clouded with dusky. There appears to be a marked difference in the size of the sexes, the female being one to two inches shorter than the male.

69. Rissa tridactyla, Linn.

"Nowavâh" (Little Nowyah), Cumberland Eskimo. "Tattarat," or "Tatarak," Greenlanders and Eskimo about Frobisher Straits.

The kittiwake was first noticed in the Straits of Belle Isle, on our outward passage, the 18th of August, 1877. From this point northward

they were with us constantly, if we were near land or far out at sea, in storm or calm, fog or snow; no day—scarcely an hour—but some of these interesting birds were our companions; often a few individuals only, at other times flocks of many hundreds or even perhaps thousands on the islands of the north Labrador coast. In Cumberland they are by far the most common gull, and in fact the most abundant species in fall, but so far as I could learn do not breed there. From September till the ice covered the water they were extraordinarily abundant, congregating in immense flocks. When the tide runs strong they follow the stream for many miles in regular order, about half their number constantly dipping into the water, while the rest fly on ahead a few feet; while thus feeding they remind one of a flock of passenger-pigeons feeding in a grain-field. The food obtained at such a time is mostly small crustaceans.

When a good feeding-place is found, the whole flock settles down, and so close together that almost any number can be shot. The jaegers are always on the alert for such flocks, and when they get near the gulls, they all foolishly take wing, when the jaeger singles out a likely looking subject, which is soon made to disgorge. The flock soon settles again, and the same manœuvre is repeated.

I did not see a single kittiwake in the upper Cumberland waters during spring or summer, where there were thousands the previous autumn. A very few immature birds were noticed on an iceberg, July 18, near Cape Mercy; but these were all I saw till nearing the Greenland coast, where they are more common still. The flesh is highly esteemed by the Danes resident on the Greenland coast; in fact, they form no inconsiderable portion of their meat supply during the latter part of July and August and September. We found the flesh of the young quite acceptable.

A few young birds were observed along the east coast of the Penny Peninsula as far as Exeter Sound, and in the pack-ice an occasional specimen was seen; but when nearing the coast of Disko their numbers increased to thousands. They followed the schooner constantly from this point till we got to the southern shores of Newfoundland, where few were seen.

Among the specimens collected by me were some that had scarcely any hallux, while in others it was as well developed as in any gull, and having a perfect nail. There is also every gradation between the two.

I saw a gull a little larger than *tridactyla*, in Godhavn Harbor, one day; it had a black head. The same afternoon Governor Fencker saw

it in front of one of the Eskimo huts, feeding from a pile of garbage; he also failed to secure it. The bird looked to me like an adult *L. franklini*, a bird not hitherto taken up as belonging to the Greenland fauna.

70. Xema sabinii, (Sab.) Leach.

On the 6th of October, 1877, on the passage from the Kikkerton Islands northward, a pair of these birds kept close to the stern of the schooner for many miles. I could easily have shot them, but it would have been impossible to procure them had I done so. Saw no others at any time.

71. Sterna macrura, Naum.

"Emukitilak," Cumberland Eskimo and Greenlanders.

On the 19th and 20th of June there were thousands of these birds about Annanactook Harbor, but this was also the only time I saw any. The Eskimo say they breed on the Seven Islands in Cumberland some years. They were first noticed in the Gulf of Saint Lawrence in August. From this point they seemed more or less common along the entire Labrador coast and the islands north of Hudson's Straits, but not in Cumberland. On the Greenland coast they are abundant, in suitable localities, to lat. 73° N. In Disko Bay they are very common, and breed by thousands. They begin migrating southward during the latter days of August, when the young are large enough to take care of themselves. Appeared to be plenty at the mouth of Exeter Sound, where "kaplin" are very abundant.

72. Fulmarus glacialis, Leach.

"Oohudluk," Cumberland Eskimo. "Kakordluk" (white) and "Igahsook" (dark), Greenlanders.

On our outward passage these birds were first noticed off Belle Isle, August 20. From this point northward their numbers increased; they were everywhere close in shore and far out at sea, at all times and in all weather. Nearly all the Fulmars I saw in the autumn of 1877 were light-colored; saw none so dark as I did in the spring. They were very common in Cumberland till the middle of October. Were especially abundant off shore, Cape Chidly, Resolution Island, Grinnell Bay, and Frobisher Straits, during the latter part of August, September, and fore part of October. These were white with a pearly grey mantle and bright yellow bill. I also procured a few that were ashy; these I presumed were young birds; but in July, 1878, I found a few of these dark-colored ones, darker than any I ever saw in fall, breeding near Quickstep Harbor,

in Cumberland, on some small rocky islands. When fresh these dark-colored birds have a *bright olive-green gloss*, especially apparent on the neck and back. The bill is shorter, stouter, and thicker, dusky brown instead of yellow. On Blue Mountain, Ovifak, Greenland, these birds breed by myriads to the very summit of the mountain, about 2,000 feet. Here I could see *but few dark* birds; even the full-fledged nestlings were white.

In Exeter Sound and to the northward along the west shores of Davis Straits and Baffin's Bay, the dark variety seems to predominate. Near Cape Searle they are extraordinarily abundant, breeding by thousands on the Padlie Island, and they are so tame about their nesting-places that they can be killed with a stick. The eggs, even after being blown, for many months still retain the musky odor peculiar to the birds. Perfectly fresh eggs are quite good eating, but if a couple of days old the musky odor has so permeated them, even the albumen, that they are a little too much for a civilized palate.

So far as my observations went, more dark birds were seen in spring than in fall, so the dark plumage cannot be characteristic of the young.

The mollimoke is one of the greediest of birds. I have seen them feeding on the carcass of a whale, when their looks and actions were perfectly those of a vulture,—completely begrimed with blood and grease, and so full that they could not take wing. I found great difficulty in procuring white specimens that were not more or less daubed over with "gurry," especially about the head and neck. These birds possess extraordinary powers of flight, and are marvelously graceful on the wing, rising with the billow and again settling into the trough of the sea without any apparent motion of the wings.

73. Cymochorea leucorrhoa, Coues.

Noticed sparingly about Cape Mercy and Exeter Sound. Two specimens seen in Disko Fjord in August, when they were probably nesting. Far less common on the passage southward than the following.

74. Oceanites oceanica, Keys.

Traced as far north as Resolution Island on our outward passage; on the homeward, first seen about one hundred miles south of Cape Farewell.

75. Puffinus kuhli, (Briss.) Boie.

Common from Belle Isle to Grinnell Bay. Not observed in Cumberland, on the Greenland coast.

76. Puffinus major, (Briss.) Faber.

Abundant from Belle Isle to Resolution Island. Not observed in Cumberland.

77. Colymbus torquatus, Linn.

"Toodlik," Cumberland Eskimo and Greenlanders.

Quite common in Cumberland, where it breeds. Saw no specimens that approached the variety *adamsi*.

78. Colymbus arcticus, Linn.

"Codlulik," Cumberland Eskimo.

Not common, but breeds in Kingwah Fjord. First specimen shot June 24. Saw a few in autumn near Grinnell Bay. Not found in North Greenland according to Governor Fencker.

79. Colymbus septentrionalis, Linn.

"Kuksuk," Cumberland Eskimo. "Karksauk," Greenlanders.

Very common in all the localities visited by me. Begins nesting in the upper Cumberland waters in the latter part of June. The nest is placed on the low rocks with very little grass and moss beneath the eggs. They are very noisy, especially during the mating season. Do not leave as long as there is open water.

80. Utamania torda, Leach.

"Akparnak," Greenlanders.

Was seen on many occasions and often in close proximity to the ship from the outer islands of the Middle Labrador coast to Frobisher Straits. They were often noticed considerable distances from land. Are not found in Cumberland, but by no means rare on the entire west coast of Greenland to latitude 69° N. Off the North Labrador coast I noticed on several occasions a small auk (?) intermediate in size between *Mergulus alle* and *Uria grylle*, with much the same pattern of coloration as the former, but with tufts or plumes of white feathers on the head. I saw some with single young, and at one time killed three at a single discharge; but the ship was under such headway that the sailor stationed on the waist could not reach them with his pole and net. The bird is entirely unknown to me, but I suspect it will be found to be one of the small auks hitherto supposed to belong only to the North Pacific.

81. Fratercula arctica, (L.) Ill.

"Killaugak," Greenlanders.

Observed abundantly in the Gulf of St. Lawrence, and thence northward to Hudson's Straits. Not known to the Cumberland Eskimo; but common on the Greenland coast to 70° N. at least. Breeds plenti-

fully on the Hunde and Green Islands in Disko Bay, where eggs were procured. There seems to be no appreciable difference in Gulf of St. Lawrence specimens and those from North Greenland except in size.

82. Mergulus alle, L.

"Kaerrak," Greenlanders.

Common on the north coast of Labrador, off Resolution Island, Grinnell Bay, and Frobisher Straits, but did not see any in Cumberland. I showed specimens to the Eskimo, and they called it a young "akpa" (*Lomvia arra*). So I presume the bird is very rare, if found at all, in the Cumberland waters. Still they are abundant off Exeter Sound and to the northward on the west coast of Baffin's Bay. Governor Fencker says they nest to latitude 78° N., and perhaps farther. Nest abundantly on the Whale Islands in Disko Bay. I procured young off Resolution Island in the fore part of September. They were very common among the pack-ice in Davis Straits during July. Often a considerable number would be seen sitting on the ice. They seem devoid of fear. I have caught them from the schooner's deck with a net on the end of a pole while they were swimming alongside.

83. Uria grylle, (L.) Lath.

"Pesholak," Cumberland Eskimo. "Serbek," or "Sergvak," Greenlanders.

Was first observed off Resolution Island in the first days of September, 1877. They were then busily engaged fishing and carrying the fish up the cliffs to the young, which were not yet in the water. They are most expert divers and are often seen fishing where there is a considerable depth of water. I once shot an adult female that was carrying a little *Morrhua* 7 inches in length up to her young. This was on the 19th of September, and the young were not more than three-fourths grown at this date. I visited no locality either on Cumberland or on the Greenland coast where this bird was not abundant. Some sections are of course more suitable than others, and here they are very numerous. They began to change into the winter plumage in the latter part of September. Some of the earlier-hatched young were much earlier than this, but the adults were not in perfect winter dress till the middle of October. They remained about our winter harbor as long as there was open water, and even one or two staid in the Kingwah rifts all winter. In spring they returned as soon as there was open water. About the Southern Cumberland waters some remain all winter,—the Eskimo say only the young birds. At Annanactook Harbor they began nesting about June 25. The normal number of eggs is two; very rarely

three are found. Always nest in crevices and fissures of cliffs, where it is often extremely difficult to get at them. They are very tame; but it is next to an impossibility to shoot one on the water if the bird is watching you, for they dive quite as quickly as a loon. I have seen three entirely black specimens, which I considered to be *U. carbo*. One was procured in Cumberland, but was lost, with many others, after we arrived in the United States. I have examined specimens of *carbo* since in the Smithsonian collection, and my bird was nothing but a melanistic specimen of *U. grylle*. I also have seen an albino specimen.

There were a few birds in an air-hole in the ice near our harbor in the latter days of June that to all appearance resembled the autumn plumage of the young; but the ice was too treacherous for me to venture out, so I sent an Eskimo. He returned and reported them "Kanitucalo pechulak" (very near a Guillemot). But if he meant that they were in imperfect plumage or another species closely resembling *grylle*, I could not make out. He could not get close enough to the air-hole to procure the specimen he killed, and I never saw or heard anything more of them.

84. Lomvia arra, Brandt.

"Akpa," Cumberland Eskimo and Greenlanders.

I had hoped to be able to throw some light on the subject of the relationship of the Murres, but I find my material corresponds with my opportunities for observation—very poor and unsatisfactory. I first met these birds in numbers off the coast of Resolution Island, but many were seen farther south. About Grinnell Bay and Frobisher Straits they are common even as far as the mouth of Cumberland, but apparently quite rare in the waters of that sound The Eskimo say they formerly bred in great numbers on the Kikkerton Islands; but they have now apparently abandoned them. There are large breeding-places about Cape Mercy and Walsingham, the largest "rookery" being on the Padlie Islands in Exeter Sound. On the Greenland coast they are very abundant, breeding by thousands in many localities. Observed plentifully in the pack-ice in July. All the specimens collected by me were typical *arra*. I procured but one single *troile*. The var. *ringvia*, Brünn., Governor Fencker has not met during eleven years' collecting on the Greenland coast; and var. *troile* appears to be far from common. There is a remarkable variation in the distribution of the dark color, some being white on the throat quite to the bill, and again I have seen specimens entirely black. The dark markings on the eggs of *L. arra* and *troile*, as well as *A. torda*, can readily be obliterated with luke-warm water.

FISHES

COLLECTED IN CUMBERLAND GULF AND DISKO BAY.

By Tarleton H. Bean.

The collection of fishes made by Mr. Kumlien embraces ten species, as follows:

1. *Boreogadus saida.*
2. *Gadus ogac.*
3. *Gymnelis viridis.*
4. *Liparis vulgaris.*
5. *Cyclopterus lumpus.*
6. *Cottus scorpius.*
7. *Cottus scorpius* sub-species *grönlandicus.*
8. *Cottus scorpioides.*
9. *Gymnacanthus pistilliger.*
10. *Gasterosteus pungitius* sub-species *brachypoda.*

With these I have combined several species collected by Lieut. W. A. Mintzer, U. S. N., in Cumberland Gulf in 1876, the two following being additions to Mr. Kumlien's list:

11. *Lycodus mucosus.*
12. *Salvelinus Naresi.*

Besides giving a report upon these twelve species recently obtained by the United States National Museum, I have made a list of the species recorded from Northeastern North America, which is by no means complete, but is as nearly so as the limited time allowed me for searching would permit. Of course there are many Greenland species which we may be sure are found also on our northeastern coast, but we have as yet no positive evidence of their occurrence.

The additions to our collections and to our knowledge of the species made by Mr. Kumlien are by far the most important contributions from the region in question hitherto received by the museum, and that excellent naturalist deserves hearty acknowledgments for the valuable material which he has secured in the face of great obstacles. Two of the species taken by him have not before been recorded from the northeast

coast—*Cottus scorpius* and *Gasterosteus pungitius* sub-species *brachypoda*. Many of the others are extremely rare in collections.

Lieutenant Mintzer's collection also, though small in the number of species, is rich in interest, and has greatly extended our acquaintance with some of the rarest of northern forms.

Family, PLEURONECTIDÆ.

1. Pleuronectes Franklinii Günther.

Pleuronectes Franklinii GÜNTH., Cat. Fish. Brit. Mus., iv, 1862, p. 442.
Pleuronectes (Rhombus) glacialis RICH., F. B. A., iii, 1836, p. 258.
Platessa glacialis RICH., Voy. Herald, Fishes, 1854, p. 166, pl. xxxii.

Richardson records the species from Bathurst's Inlet (67° 40′ N., 109° W.); Dr. Günther has Arctic American specimens from Dr. Rae and the Haslar collection. Judging from the descriptions given by Richardson and Günther, *Pleuronectes Franklinii* is very closely related to *P. glaber* (Storer) Gill.

2. Hippoglossus vulgaris Fleming.

Halibut KUMLIEN, in lit. Feb. 16, 1879.

Mr. Kumlien writes me, that "in February a large halibut was caught in a seal breathing-hole by an Eskimo, but it was something entirely unknown to them."

It may be that this was not *Hippoglossus vulgaris*, but *Platysomatichthys hippoglossoides* (=*Reinhardtius hippoglossoides* (Walb.) Gill).

Family, GADIDÆ.

3. Boreogadus saida (Lepech.) Bean.

Gadus fabricii RICH., Faun. Bor. Amer., 1836, p. 245: GÜNTHER, Cat. Fishes Brit. Mus., iv, 1862, p. 336.
Boreogadus polaris GILL, Cat. Fishes E. Coast N. A., 1873, p. 17.

21746. (310.) Annanactook, Cumberland Gulf, A. L. Kumlien. D. 14, 18, 18. A. 21, 19. P. 17. V. 6. Length 250 millimetres.

The inequality of the caudal lobes mentioned by Gill* is evident in this example; the length of the upper lobe, measured from the origin of the middle caudal rays, is 31 millimetres, of the lower lobe 27. The outline of the lower lobe is decidedly convex below. The middle caudal rays, instead of pursuing the horizontal of the median line of the body, are slightly raised, giving the fin a peculiar shape, which may perhaps be due to outside circumstances, or may be characteristic of the adult.

*Proc. Acad. Nat. Sci. Phila. 1863, p. 233.

The inequality of the lobes and the singular shape are not present in the smaller individuals referred to below.

Mr. Kumlien sent the following notes of color: "Brassy red; belly white; eye red. Fins dark purple brown." A sketch of this specimen by Mr. Kumlien has the caudal lobes equal.

21747. (481.) Kingwah Fjord, Cumberland Gulf, A. L. Kumlien. D. 13, —, 20. A. 16, 21. V. 6. Length 180 millimetres.

"Found on a seal-hole. Iris silvery white. Fins dark purple brown. Belly and lower parts silvery. Back brassy olive brown."—*Kumlien.*

21748. (857.) Head of Cumberland Gulf, A. L. Kumlien. D. 13, 16, 20. A. 19, 21. P. 19. V. 6. Length 160 millimetres.

"Dark brassy red, becoming blue-black on head. Silvery white on belly. Pectorals white. All the rest of the fins dark purple-blue."—*Kumlien.*

21753. (369.) Cumberland Gulf, Jan. 2, 1878, A. L. Kumlien. Length 112 millim.

"The principal food of *Pagomys fœtidus* at this season."—*Kumlien.*

I have followed the lead of Malmgren* and Collett† in employing the name *Gadus saida* Lepech. Professor Collett has made a direct comparison of examples of this form of cod from Archangel, Greenland, Spitzbergen, and Nova Zembla, and he believes the *polaris* of Sabine, 1824, *Fabricii* of Richardson, 1836, and *agilis* of Reinhardt, 1838, to be identical with *G. saida.* The only difference that he observed is that individuals from the White Sea have, as a rule, darker fins than the rest, which he justly attributes to a difference in the surroundings of the bottom in the different places. They agree in squamation, structure of the teeth, position of the anus, and in every particular of the structure of the body so completely that they cannot possibly be separated.‡

4. Pollachius carbonarius (Linn.) Bon.

Merlangus carbonarius RICH., Last of the Arctic Voyages, 1855, p. 375.

Richardson records the species from Davis Strait.

5. Gadus morrhua Linn.

Gadus morrhua RICH., F. B. A., iii, 1836, p. 243.

Richardson states that Davis observed many cod in the possession of the Eskimo who live between Cape Raleigh and Cumberland Strait.

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*Öfv. Kgl. Vet. Akad. Förh. 1864, p. 531.

†Christiania Vid. Selsk. Förh. No. 14, 1878, (p. 80).

‡Men iövrigt stemme de i Skjælbeklædning, Tandbygning, Stillingen af Anus og i ethvert Punkt af deres Legemsbygning saa fuldkommen overens, at nogen Adskillelse mellem den ikke er mulig.—*Collett, l. c.*

6. Gadus ogac Rich.

Gadus ogac RICH., Faun. Bor. Amer., iii, 1836, p. 246.
Gadus ovak RHDT., Vid. Selsk. Naturvid. og Math. Afh., deel vii, 1838.
Gadus ogat KRÖYER, Voy. en Scand., &c., pl. xix.

21723. (1417.) ♂ Godthaab, Greenland, August 11, 1878. D. 13, 19, 22. A. 22, 21. V. 6. Length of specimen 330 millimetres.

A black spot on the second dorsal, $\frac{2}{3}$ as long as the eye, between the thirteenth and fifteenth rays.

21724. (1418.) ♀ Godthaab, Greenland, August 11, 1878. D. 14, 18, 20. A. 20, 18. V. 6. Length of specimen 359 millimetres.

The lateral line shows an interruption, measuring 22 millimetres on the left side, the right being normal. The first portion of the lateral line ends at the vertical through the interspace between the first and second dorsals; the second portion begins at the vertical let fall from the sixth ray of the second dorsal.

21725. (1419.) ♀ Godthaab, Greenland, August 11, 1878. D. 14, 17, 18. A. 19, 20. V. 6. Length of specimen 300 millimetres.

Richardson records this species at Cape Isabella, Peninsula of Boothia.

Gadus ogac Rich., may be only a variety of *G. morrhua* Linn., as claimed by Dr. Günther; but after examining many specimens of the latter species and comparing them with Mr. Kumlien's examples, I prefer to consider these distinct from *G. morrhua* and identical with Richardson's species. It may be that a larger series would lead me to the same conclusion reached by Dr. Günther. I have studied all the common cod in the United States National Museum, a very large series, recently increased by the addition of a monster weighing 100 pounds, and find that *Gadus ogac* is distinguished from *G. morrhua* by several important characters, among which are (1) a more slender caudal peduncle; (2) a longer barbel; (3) a larger eye; (4) a greater distance between the eyes; (5) a longer pectoral; and (6) the more advanced position of the ventrals. These differences may be seen in the tables of measurements, in which are given the proportions of parts of the body in hundredths of the total length without the caudal.

The general color of Mr. Kumlien's specimens is very dark brown, and the sides are marbled with white.

Table of Measurements.

Species, *Gadus ogac* Rich.

Current number of specimen	21,723.		21,724.		21,725.	
Locality	Greenland.		Greenland.		Greenland.	
	Millimetres.	100ths of length.	Millimetres.	100ths of length.	Millimetres.	100ths of length.
Extreme length (without caudal)	305		330		275	
Length to end of middle caudal rays	330		359		300	
Body:						
Least height of tail		5		5		5½
Head:						
Greatest length		27½		30		30
Width of interorbital area		9		9		9
Length of snout		9		10		
Length of barbel		6		6½		6½
Length of maxillary		12		13		13
Length of mandible		15		15½		16
Diameter of orbit		6		6		6½
Dorsal (first):						
Length of longest ray		14½		16		14
Pectoral:						
Length		16		17		17½
Ventral:						
Distance from snout		25		25		25
Length		15		15		15
Dorsal	13, 19, 22		14, 18, 20		14, 17, 18	
Anal	22, 21		20, 18		19, 20	
Ventral	6		6		6	

Table of Measurements—Continued.

Species, *Gadus morrhua* Linn.

Current number of specimen	17,405.		17,406 *a*.		17,406 *b*.		17,406 *c*.	
Locality	Lofoten, Norway.		Bergen.		Bergen.		Bergen.	
	Millimetres.	100ths of length.	Millimetres.	100ths of length.	Millimetres.	100ths of length.	Millimetres.	100ths of length.
Extreme length (without caudal)	312		413		296		300	
Length to end of middle caudal rays	341		448		324		330	
Body:								
Least height of tail				5½		6		6
Head:								
Greatest length		29		28½		30		28
Width of interorbital area		7½		7½		7½		7
Length of snout				10		10½		9
Length of barbel		5½		4½		5½		5
Length of maxillary		13		12½		13		12
Length of mandible		15		15		15		14½
Diameter of orbit		5½		5		6		5½
Dorsal (first):								
Length of longest ray				15		15		14
Pectoral:								
Length		14½		13½		14		14½
Ventral:								
Distance from snout		27		26		27		27
Length		14½		14		15½		14

Family, LYCODIDÆ.

7. Gymnelis viridis (Fabr.) Rhdt.

21739. (726.) Head of Cumberland Gulf, June 13, 1878. Length of longer 63 millim. Length of shorter 59 millim.

"Gravel beach, at low tide."—*Kumlien.*

21749. (648.) Head of Cumberland Gulf, May 30, 1878. *a*, 109 millim. *b*, 103 millim. *c*, 65 millim. *d*, 60 millim.

"Coogjannernak of the Eskimo."—*Kumlien.*

21757. (661.) Head of Cumberland Gulf, June 6, 1878. D. 95. A. 77. Length of specimen 104 millim.

"Gravel beach."—*Kumlien.*

21758. (647.) Head of Cumberland Gulf, May 30, 1878. D. 105. Length of example 147 millimetres.

"Tide-rifts, among stones."—*Kumlien.* Color-sketch accompanying.

21759. (646.) Head of Cumberland Gulf, May 30, 1878. D. 102. Length 142 millim.

"Tide-rifts, among stones."—*Kumlien.*

21760. (645.) Head of Cumberland Gulf, May 30, 1878. D. 100. Length 142 millim.

"Tide-rifts, among stones."—*Kumlien.*

21999. (86.) Niantilic, Cumberland Gulf, August, 1876. W. A. Mintzer, U. S. N. *a*, 210 millim. *b*, 176 millim.; D. ca. 95; A. 77; P. 13. *c*, 175 millim.; A. 75; P. 12. *d*, 124 millim.; A. 78; P. 13.

"Found between high and low water mark."—*Mintzer.*

This species is recorded from Prince Regent's Inlet (Rich., F. B. A., iii, 1836, p. 271; stomach of kittiwake gull); Northumberland Sound, 76° 53′ N. (Rich., Last Arc. Voy., 1855, p. 367, pl. xxix, and as var. *unimaculatus*, p. 371, pl. xxx); lat. 81° 52′ N. (Günth., P. Z. S., 1877, p. 293), and Franklin Pierce Bay (Günth., op. cit., p. 476).

Kröyer has found in the stomachs of specimens examined by him, "crabs . . . . once *Gammarus locusta* Linn.; another time Entomostraca."* Prof. Robert Collett found in the mouth of a specimen secured in the summer of 1878 by the Scandinavian Expeditions, an example of *Modiolaria lævigata* Gray.†

8. Lycodes mucosus Rich.

Lycodes mucosus RICH., Last of Arctic Voyages, 1855, p. 326, pl. xxvi.

16930. Cumberland Gulf, W. A. Mintzer, U. S. N.

A single individual of this species, originally described from Northumberland Sound, was found by Lieutenant Mintzer, and presented by him to the United States National Museum. From the appearance of the specimen it must have been picked up dead; but it is in a good state

* Naturhistorisk Tidsskrift, 3 R., I. B. (author's extra), p. 34.

† Christiania Vid. Selsk. Forh. 1878, No. 14, (p. 78).

of preservation. As there is little on record concerning the species, and the example under consideration is much larger than the types, and, while it agrees in all important particulars with Richardson's description and figure of *L. muscosus*, still shows some differences in the measurements, I have drawn up a description and prepared an accompanying table of measurements. It will be observed that in Lieutenant Mintzer's specimen the head is longer and wider and the height and width of body slightly less than in the types, which variations may be accounted for by the difference in size.

Like all the other described species of *Lycodes*, except *L. paxillus* Goode & Bean, of which I have knowledge, the width of the body at the vent is very much less than just behind the pectorals, and the height of the body at the same point is also considerably less than it is in the anterior part of the body; in other words, the body tapers decidedly, and the tail is much compressed.

Description.—The length of the example is 430 millimetres (17 English inches). Scales are entirely wanting.

The greatest height of the body (at the pectorals) is contained 8 times and its greatest width (just behind the pectorals) 9 times in the total length. The width at the vent is contained 8 times in the length of the head, and twice in the length of the longest dorsal ray. The height at the ventrals about equals the height of the body at the pectorals. The height of the body at the vent equals half the greatest width of the head, and is contained 11½ times in the total length.

The head is very large, its length being $\frac{7}{25}$ of the total, and its greatest width contained 5¾ times in the whole length. The distance from the tip of the snout to the nape is $\frac{1}{6}$ of total length, and $\frac{1}{3}$ of the length of the mandible. The distance between the eyes is contained 6 times in the length of the head. The length of the snout is $\frac{1}{3}$ of the length of the head. The nostrils are much farther from the eyes than from each other, their distance from the eyes being contained 4⅓ times in the length of the head. The length of the upper jaw is contained 6¼ times in the total length; of the lower jaw, 6⅔ times; the upper jaw slightly exceeding the mandible in length. The eyes are very small, close together, and high, their long diameter being equal to $\frac{1}{11}$ of the length of the head.

The distance from the tip of the snout to the beginning of the dorsal fin is contained 3¼ times in the total length. The first ray of the dorsal is contained 5⅓ times in the length of the head, and the longest, 4 times.

The distance of the anal from the snout is $\frac{11}{20}$ of the total length and

almost equals twice the distance of the pectoral from the snout. The first anal ray is contained $9\frac{1}{3}$ times in the length of the head, the longest $4\frac{1}{3}$ times. The vent is nearly in the middle of the total length.

The distance from the tip of the snout to the base of the pectoral is contained $3\frac{1}{2}$ times, and the length of the pectoral $6\frac{2}{3}$ times in total length. The length of the pectoral equals that of the mandible, and only slightly exceeds one-half of the length of the head.

The distance of the ventral from the tip of the snout equals the length of the head. The length of the ventral equals the long diameter of the eye.

Radial formula.—D. (including half of caudal) 90; A. (including half of caudal) 71; P. 18; V. 3.

Colors.—These agree, in the main, so closely with Richardson's description of them, that it is unnecessary to say more than that the cross-markings are faint and narrow.

The gape of the mouth is very wide. The character and arrangement of the teeth agree perfectly with the original description.

Table of Measurements.

Current number of specimen	16,930.		
Locality	Cumberland Gulf.		
	Millimetres.	100ths of length.	Times in total.
Extreme length	430		
Body:			
Greatest height (at pectorals)		$12\frac{1}{2}$	8
Greatest width (behind pectorals)		11	9
Width at vent		$3\frac{1}{2}$	In head 8
Height at ventrals		13	Nearly 8
Height at vent		8.7	$11\frac{1}{2}$
Head:			
Greatest length		28	$3\frac{1}{2}$
Distance from snout to nape		20	5
Greatest width		$17\frac{1}{2}$	$5\frac{1}{2}$
Distance between eyes		$4\frac{1}{2}$	In head 6
Length of snout		$9\frac{1}{2}$	In head 3
Distance of nostrils from eye		$6\frac{1}{2}$	In head $4\frac{1}{2}$
Length of upper jaw		16	7
Length of mandible		15	$6\frac{2}{3}$
Distance from snout to orbit		$9\frac{3}{4}$	$10\frac{1}{2}$
Long diameter of eye		$2\frac{3}{4}$	In head $10\frac{1}{2}$
Dorsal:			
Distance from snout		31	$3\frac{1}{2}$
Length of first ray		5	20
Length of longest ray		7	14
Anal:			
Distance from snout		55	$1\frac{8}{11}$
Length of first ray		3	33
Length of longest ray		$6\frac{1}{2}$	15
Distance of vent from snout		55	$1\frac{8}{11}$
Pectoral:			
Distance from snout		$28\frac{1}{2}$	$3\frac{1}{2}$
Length		15	$6\frac{2}{3}$
Ventral:			
Distance from snout		28	$3\frac{1}{2}$
Length		$2\frac{1}{2}$	40
Dorsal	90		
Anal	71		
Pectoral	18		
Ventral	3		
Scales	None.		

9. Lycodes polaris (Sabine) Rich.

Blennius polaris SABINE, App. Parry's First Voy., p. ccxii.

Lycodes polaris RICH., Last Arc. Voy., 1855, p. 362.

Described from North Georgia, lat. 75° N., long. 110° W. Recorded, also, from the west side of the Peninsula of Boothia by Capt. J. C. Ross.

10. Uronectes Parryi (Ross) Günther.

Ophidium Parrii Ross, in Parry's Third Voy., App., p. 109; Polar Voyage, p. 199.—RICH., F. B. A., iii, 1836, p. 274.

Discovered in Baffin's Bay and Prince Regent's Inlet. Observed near Felix Harbor, ejected by a glaucous gull.—*Rich., l. c.*

Family, STICHÆIDÆ.

11. Centroblennius nubilus (Rich.) Gill.

Lumpenus nubilus RICH., Last Arc. Voy., 1855, p. 359, pl. xxviii.

This species was described from Northumberland Sound, lat. 76° 53′ N.

Family, ZIPHIDIONTIDÆ.

12. Murænoides fasciatus (Schn.) Gill.

Gunnellus fasciatus RICH., Last Arc. Voy., 1855, p. 357, pl. xxvii.

Richardson records the species from Northumberland Sound.

Family, CYCLOPTERIDÆ.

13. Eumicrotremus spinosus (Fabr.) Gill.

Cyclopterus spinosus GÜNTH., P. Z. S., 1877, pp. 293, 476.

Günther has examined specimens from Franklin Pierce Bay.

14. Cyclopterus lumpus Linn.

21726. (1411.) Godthaab, Disko Island, Greenland.

Mr. Kumlien brought down a single specimen 430 millimetres in length, and furnished the following notes of color: "Varying shades of dusky olive green. Dorsal light. Belly nearly white. Iris umber."

Family, LIPARIDIDÆ.

15. Liparis vulgaris Fleming.

Liparis lineata (LEP.) KRÖYER, Nat. Tidsskrift, ii, 2, p. 284; iii, 1, p. 244; Voy. en Scand., &c., pl. xiii, fig. 2.

Liparis lineatus COLLETT, Christiania Vid. Selsk. Forh. 1878, No. 14, (p. 32).

21762. (657.) Annanactook, Cumberland Gulf. D. 42. A. II, 34. P. 35. C. 11.

Taken in "7 fathoms. Nee-fitz-shak of the Eskimo."—*Kumlien.*

21763. (859.) Head of Cumberland Gulf, June 29, 1878. (*a*) D. 19, 23; A. 34. (*b*) D. 19, 21; A. 35.

"Fastened to kelp in 7 fathoms."—*Kumlien.*

21764. (860.) Annanactook, Cumberland Gulf, June 29, 1878.

"Fastened to kelp."—*Kumlien.*

21765. (858.) Head of Cumberland Gulf, June 29, 1878. D. 41. A. 34. P. 34. C. 10. "Fastened to kelp in 5 fathoms."—*Kumlien.*

21752. (573.) Annanactook, Cumberland Gulf.

Referred doubtfully to *L. vulgaris.* The specimen is young and in bad condition. It was taken in 9 fathoms.

Richardson (F. B. A., iii, 1836, p. 263) mentions this species from the west side of Davis Strait in lat. 70°, and from Regent's Inlet.

Professor Collett found the alimentary canal of one of his specimens filled with small amphipods, one of them being *Caprella septentrionalis* Kr., together with many individuals of *Protomedeia fasciata* Kr.*

16. Liparis Fabricii Kröyer.

Liparis Fabricii GÜNTHER, P. Z. S., 1877, pp. 294, 476.

Dr. Günther has examined specimens collected in Discovery Bay and Franklin Pierce Bay.

Family, AGONIDÆ.

17. Aspidophoroides monopterygius (Bloch) Storer.

Aspidophoroides monopterygius GÜNTH., P. Z. S., 1877, p. 295.

A young individual was taken in 30 fathoms, lat. 65° N., long. 53° W.—*Günther, l. c.*

Family, COTTIDÆ.

18. Cottus scorpius Linn.

21989. (151.) ♀ Niantilic Harbor, Cumberland Gulf, A. L. Kumlien.

21742. (180.) ♂ Niantilic Harbor, Cumberland Gulf, A. L. Kumlien.

Mr. Kumlien collected this individual on the 25th of September, 1877, at which time its colors must have been exceedingly brilliant, judging from the traces which still remain. He states in his notes, that it lives "among the rocks at the bottom, feeding largely on crustacea and mollusks." *Cottus scorpius*, and the sub-species *grönlandicus*, but especially the latter, formed an important part of the food supply of the expedition.

These specimens of *Cottus scorpius* are clearly identical with Scandinavian examples of the same species, as may be seen from the tables of measurements which follow. In all the tables it must be remembered that the unit of length is the total length without caudal. So far as I know, the true *Cottus scorpius* has not previously been found on the east coast of America. A young individual, catalogue-number 10374, collected at Eastport, Me., by the United States Fish Commission, may be compared with one a trifle larger, catalogue-number 22060, which

*Collett, l. c.

was presented to the United States National Museum by Prof. Robert Collett. The agreement between these two in all essential particulars is very striking. We may safely record this species, then, at least as far south as Eastport. The true *Cottus scorpius* may be distinguished from the sub-species which follows by its narrower interorbital distance, and the lesser length of the dorsal spines, particularly the anterior ones.

Table of Measurements.

Species, *Cottus scorpius* Linn.

Current number of specimen	21,742 ♂.		21,989, ♀.		10,374, juv.	
Locality	Cumberland Gulf.		Cumberland Gulf.		Eastport, Me.	
	Millimetres.	100ths of length.	Millimetres.	100ths of length.	Millimetres.	100ths of length.
Extreme length	169	.....	180	.....	88	.....
Length to origin of middle caudal rays	140	.....	150	.....	72	.....
Body:						
Greatest height	.....	23	.....	24	.....	24
Greatest width (at pectoral base)	.....	21	.....	21	.....	20
Height at ventrals	.....	23	.....	24	.....	24
Least height of tail	.....	6	.....	6	.....	6½
Head:						
Greatest length	.....	38	.....	38	.....	39
Distance from snout to nape	.....	26	.....	27	.....	28
Greatest width at base of præop. spines	.....	23	.....	23	.....	23
Width of interorbital area	.....	5½	.....	4½	.....	5
Length of snout	.....	9	.....	9	.....	8
Length of upper jaw	.....	18½	.....	18	.....	17
Length of mandible	.....	20	.....	20	.....	19
Distance from snout to orbit	.....	10	.....	10	.....	.....
Diameter of orbit	.....	8	.....	8	.....	10
Dorsal (spinous):						
Distance from snout	.....	34	.....	36	.....	35
Length of base	.....	23	.....	25	.....	22
Length from end of dorsal to origin of middle caudal rays	.....	10	.....	10	.....	.....
Length of first spine	.....	10	.....	9	.....	11
Length of second spine	.....	11	.....	10	.....	12
Length of third spine	.....	12	.....	11	.....	13
Length of fourth spine	.....	12	.....	12	.....	12
Length of fifth spine	.....	12	.....	12	.....	11
Length of sixth spine	.....	12	.....	12	.....	10
Length of seventh spine	.....	10	.....	11	.....	8
Length of eighth spine	.....	9	.....	9	.....	5½
Length of ninth spine	.....	6	.....	7	.....	3
Length of tenth spine	.....	3½	.....	2	.....	.....
Length of longest ray	.....	16	.....	17	.....	16
Length of last ray	.....	5	.....	6	.....	.....
Anal:						
Distance from snout	.....	64	.....	64	.....	63
Length of base	.....	25	.....	24	.....	26
Length of first ray	.....	5	.....	7	.....	6
Length of longest ray	.....	13	.....	14	.....	12
Length of last ray	.....	6	.....	6½	.....	7
Caudal:						
Length of middle rays	.....	20	.....	20	.....	22
Pectoral:						
Distance from snout (upper axil)	.....	35	.....	34	.....	30
Length	.....	26	.....	27	.....	26
Ventral:						
Distance from snout	.....	32	.....	32	.....	34
Length	.....	20	.....	20	.....	21
Branchiostegals	Right VI Left VII	.....	VI	.....	VI	.....
Dorsal	X, 16	.....	X, 16	.....	IX, 15	.....
Anal	14	.....	13	.....	14	.....
Pectoral	Right 19 Left 18	.....	17	.....	17	.....
Ventral	I, 3	.....	I, 3	.....	I, 3	.....

Table of Measurements—Continued.

Current number of specimen	17,433 *a*, ♂.		17,433 *b*, ♀.		8,285, ♀.		22,060, juv.	
Locality	Bergen, Norway.		Bergen, Norway.		Sweden.		Christiania, Norway.	
	Millimetres.	100ths of length.	Millimetres.	100ths of length.	Millimetres.	100ths of length.	Millimetres.	100ths of length
Extreme length	190	.....	230	.....	.....	.....	104	.....
Length to origin of middle caudal rays	154	.....	190	.....	200	.....	85	.....
Body:								
Greatest height	.....	24	.....	25	.....	28	.....	24
Greatest width (at pectoral base)	.....	22	.....	22	.....	25	.....	21
Height at ventrals	.....	24	.....	23½	.....	25½	.....	23
Least height of tail	.....	7	.....	7½	.....	7½	.....	7
Head:								
Greatest length	.....	40	.....	41½	.....	40	.....	39
Distance from snout to nape	.....	31	.....	30	.....	29	.....	27
Greatest width at base of præop. spines	.....	28	.....	27	.....	27	.....	25
Width of interorbital area	.....	5	.....	5	.....	5½	.....	5
Length of snout	.....	9	.....	9	.....	8	.....	8
Length of upper jaw	.....	20	.....	20	.....	19	.....	18
Length of mandible	.....	21	.....	22	.....	21	.....	20
Distance from snout to orbit	.....	11	.....	10½	.....	10	.....	9½
Diameter of orbit	.....	9	.....	9	.....	8½	.....	9
Dorsal (spinous):								
Distance from snout	.....	36	.....	38	.....	37½	.....	34
Length of base	.....	27	.....	25	.....	25½	.....	25
Greatest height	.....	12	.....	10	.....	.....	.....	12
Length of first spine	.....	11	.....	11	.....	9½	.....	10
Length of second spine	.....	12½	.....	13	.....	11	.....	11
Length of third spine	.....	15	.....	14	.....	12	.....	11
Length of fourth spine	.....	15	.....	14	.....	13	.....	12
Length of fifth spine	.....	14	.....	13	.....	13	.....	12
Length of sixth spine	.....	13	.....	11	.....	12	.....	11½
Length of seventh spine	.....	11	.....	9	.....	10	.....	10
Length of eighth spine	.....	9	.....	6	.....	8	.....	8
Length of ninth spine	.....	6	.....	3	.....	5	.....	5
Length of tenth spine	.....	4	.....	.....	.....	.....	.....	3
Length of longest ray	.....	21	.....	18	.....	19	.....	17
Length from end of dorsal to origin of middle caudal rays	.....	10	.....	10½	.....	8	.....	9
Anal:								
Distance from snout	.....	64	.....	65	.....	64	.....	64
Length of base	.....	24	.....	22	.....	27	.....	26
Length of first ray	.....	10	.....	6	.....	6	.....	7
Length of longest ray	.....	16	.....	14	.....	14½	.....	13
Length of last ray	.....	9½	.....	8	.....	7	.....	8
Caudal:								
Length of middle rays	.....	23	.....	21	.....	.....	.....	22
Length of external rays	.....	15	.....	15	.....	.....	.....	.....
Pectoral:								
Distance from snout (upper axil)	.....	37	.....	37	.....	36	.....	34
Length	.....	32	.....	27	.....	28	.....	26
Ventral:								
Distance from snout	.....	34	.....	33	.....	32	.....	31
Length	.....	25	.....	19	.....	18	.....	18
Dorsal	X, I, 15	.....	IX, I, 14	.....	IX, I, 15	.....	X, 15	.....
Anal	12	.....	12	.....	13	.....	12	.....
Pectoral	16	.....	17	.....	16	.....	Right 16 / Left 15	.....
Ventral	I, 3	.....	I, 3	.....	I, 3	.....	I, 3	.....

19. Cottus scorpius L., sub-species **grönlandicus** C. & V.

Cottus grönlandicus CUV. & VAL., Hist. Nat. Poiss., iv, p. 185: GILL, Cat. Fishes E. Coast N. A., 1873, p. 22.

Cottus scorpius var. *grönlandica* LÜTKEN, Aftryk af Videnskabelige Meddelelser fra den naturhistoriske Forening Kjöbenhavn, 1876, p. 16.

21728. Godthaab, Greenland, A. L. Kumlien.

21729 Godthaab, Greenland, A. L. Kumlien.

21730. Godthaab, Greenland, A. L. Kumlien.
21731. Godthaab, Greenland, A. L. Kumlien.
21740. (151.) ♂. Niantilic Harbor, Cumberland Gulf, A. L. Kumlien.
21751. (67.) Young. Arctic Id., Cumberland Gulf, A. L. Kumlien.
16931. Many young. Cumberland Gulf, Lieut. W. A. Mintzer.

I have reached practically the same conclusion concerning the relations of *C. scorpius* and *C. grönlandicus* as Dr. Lütken, Malmgren, and Collett, since it is probable that they use the term "variety" in the same sense in which I use "sub-species." Dr. Lütken, however, supposes the *Cottus variabilis* of Ayres to be a synonym of *C. scorpius* sub-species *grönlandicus;* but it is identical with *Cottus æneus* Mitchill. The *Cottus Mitchilli* of Cuvier and Valenciennes, which was a mere name based on the *Cottus scorpius* of Mitchill, is evidently a synonym of *C. scorpius* sub-species *grönlandicus;* but the name *Cottus Mitchilli*, as used by Dr. DeKay and Professor Gill and understood in the museum catalogues, was associated with the species which should be called *C. æneus* of Mitchill. DeKay's *Cottus æneus* as described and figured is a compound of *æneus* and *octodecimspinosus*. His *C. Mitchilli* is the true *æneus* of Mitchill.

C. æneus Mitchill is the smallest of the marine sculpins of the east coast so far as known, and appears to be the least widely distributed. Its limits may be stated as Long Island on the south and Maine on the north. It has the narrowest interorbital space of our five known species. It is not uncommon to find individuals of 2½ inches in length full of spawn. The base of the anal is almost invariably shorter than that of the first dorsal. It is highly probable that DeKay's figure* of *Cottus æneus* Mitchill was drawn from a specimen of *Cottus octodecimspinosus* Mitchill, the only known Eastern American sculpin with so long a spine on the præoperculum. The number of anal rays (13) in this figure has never been recorded in *Cottus æneus*, but is common in *C. octodecimspinosus*. DeKay's figure of *Cottus Mitchilli* is a fair representation of the *æneus* of Mitchill.

Cottus scorpius sub-species *grönlandicus* has about the same southern limit as *C. æneus*, but it ranges northward to Greenland. It is abundant at Wood's Holl, Massachusetts, in winter. The United States Fish Commission has found it common in summer at different points along the coast between Cape Cod and Halifax, Nova Scotia. At Salem and Gloucester it was caught from the wharves. The stomach of an adult of medium size, taken at Wood's Holl, Mass., by the United States Fish Commission, contained three crabs, *Cancer irroratus*.

*New York Fauna, Fishes, 1842, p. 52, pl. vi, fig. 19.

Cottus octodecimspinosus Mitchill is known from Halifax on the north to Beesley's Point, New Jersey, on the south, where it was collected by Prof. S. F. Baird in 1854. It is considered a shallow-water species; but the United States Fish Commission has a specimen from 68 fathoms in the Gulf of Maine, where the temperature was about 42° Fahr. The greater portion of the examples were from 10 fathoms or less.

Add to these *Cottus scorpioides* of Fabricius, and it will complete the list of Eastern North American species of the genus *Cottus* so far as known.

As already intimated, *Cottus scorpius* sub-species *grönlandicus* is quite readily separated from the typical *C. scorpius* by its wider interorbital distance and its higher spinous dorsal, which differences are best exemplified in the specimens from Greenland, and appear, along with others, in the measurement tables.

Table of Measurements.

Species, *Cottus scorpius* sub-species *grönlandicus*.

Current number of specimen	21,731.		21,730.	
Locality	Godthaab, Greenland, Aug. 8, 1878.			
	Millimetres.	100ths of length.	Millimetres.	100ths of length.
Extreme length			226	
Length to origin of middle caudal rays	185		186	
Body:				
Greatest height		24		23
Greatest width at pectoral base		22		
Height at ventrals		24		23
Least height of tail		5½		5½
Length of caudal peduncle		11		12
Head:				
Greatest length		39		38
Distance from snout to nape		28		27
Width of interorbital area		7½		6
Length of snout		9		9
Length of upper jaw		19		19
Length of mandible		20½		20½
Distance from snout to orbit		10		10
Diameter of orbit		9		9
Dorsal (spinous):				
Distance from snout		35		33
Length of base		27		26
Length of first spine		16½		15
Length of second spine		18		16½
Length of third spine				16½
Length of fourth spine		18		16½
Length of fifth spine		19		15½
Length of sixth spine		16½		14½
Length of seventh spine		14		13½
Length of eighth spine		11		12
Length of ninth spine		8		7½
Length of tenth spine		5		5
Length of eleventh spine				3
Length of longest ray		17		19
Length of last ray		6½		8
Anal:				
Distance from snout		62		62
Length of base		25		25
Length of first ray		7		7
Length of longest ray		14		15
Length of last ray		6½		8

Table of Measurements—Continued.

Current number of specimen	21,731.		21,730.	
Locality	Godthaab, Greenland, Aug. 8, 1878.			
	Millimetres.	100ths of length.	Millimetres.	100ths of length.
Caudal:				
Length of middle rays	.....	.....	.....	21½
Pectoral:				
Distance from snout (upper axil)	.....	35	.....	34
Length	.....	28	.....	29
Ventral:				
Distance from snout	.....	29½	.....	31
Length	.....	21	.....	24
Branchiostegals	Right VI	.....	VII	.....
	Left VI	.....	VII	.....
Dorsal	X, 16	.....	XI, 17	.....
Anal	14	.....	14	.....
Pectoral	Right 17	.....	17	.....
	Left 17	.....	17	.....
Ventral	I, 8	.....	I, 8	.....

Current number of specimen	21,729.		21,728.	
Locality	Godthaab, Greenland, Aug. 8, 1878.			
	Millimetres.	100ths of length.	Millimetres.	100ths of length.
Extreme length	235	.....	218	.....
Length to origin of middle caudal rays	195	.....	178	.....
Body:				
Least height of tail	.....	5½	.....	6
Length of caudal peduncle	.....	10	.....	.....
Head:				
Width of interorbital area	.....	6	.....	6
Length of snout	.....	9	.....	.....
Length of upper jaw	.....	19	.....	.....
Length of mandible	.....	20	.....	.....
Dorsal (spinous):				
Length of first spine	.....	20	.....	18
Length of second spine	.....	21	.....	19
Length of third spine	.....	21	.....	18½
Length of fourth spine	.....	21	.....	18
Length of fifth spine	.....	21	.....	19
Length of sixth spine	.....	21	.....	18½
Length of seventh spine	.....	19	.....	17
Length of eighth spine	.....	16	.....	14
Length of ninth spine	.....	13	.....	9
Length of tenth spine	.....	10	.....	6
Length of eleventh spine	.....	6	.....	.....
Length of longest ray	.....	20	.....	20
Anal:				
Distance from snout	.....	62	.....	62
Pectoral:				
Length	.....	31	.....	.....
Ventral:				
Distance from snout	.....	33	.....	33
Length	.....	25	.....	23
Branchiostegals	Right VI	.....	VI	.....
	Left VI	.....	VI	.....
Dorsal	XI, I, 16	.....	X, I, 16	.....
Anal	14	.....	13	.....
Pectoral	Right 17	.....	17	.....
	Left 17	.....	18	.....
Ventral	I, 8	.....	I, 8	.....

Table of Measurements—Continued.

Current number of specimen	21,025 *a*, ♀.		13,879.	
Locality	Halifax, N. S.		Eastport, Me.	
	Millimetres.	100ths of length.	Millimetres.	100ths of length.
Extreme length	240	.....	129	.....
Length to origin of middle caudal rays	198	.....	106	.....
Body:				
Greatest height	.....	26	.....	25
Greatest width	.....	24	.....	.....
Height at ventrals	.....	26	.....	25
Least height of tail	.....	7	.....	7
Head:				
Greatest length	.....	42	.....	40
Distance from snout to nape	.....	30	.....	28
Width of interorbital area	.....	6½	.....	6
Length of snout	.....	9	.....	9
Length of maxillary	.....	20	.....	18
Length of mandible	.....	22	.....	19
Long diameter of orbit	.....	9	.....	9½
Dorsal (spinous):				
Distance from snout	.....	38	.....	35
Length of base	.....	23	.....	25
Length of first spine	.....	12	.....	12
Length of second spine	.....	13½	.....	13
Length of third spine	.....	14	.....	14
Length of fourth spine	.....	15	.....	14
Length of fifth spine	.....	14	.....	14
Length of sixth spine	.....	12½	.....	13
Length of seventh spine	.....	11	.....	12
Length of eighth spine	.....	8½	.....	10
Length of ninth spine	.....	6	.....	7
Length of tenth spine	.....	.....	.....	5
Length of longest ray	.....	18	.....	16½
Length of last ray	.....	8	.....	.....
Anal:				
Distance from snout	.....	64	.....	63
Length of base	.....	30	.....	25
Length of first ray	.....	9	.....	9
Length of longest ray	.....	14½	.....	12½
Length of last ray	.....	8	.....	7
Caudal:				
Length of middle rays	.....	20½	.....	21
Pectoral:				
Distance from snout	.....	37	.....	36
Length	.....	28	.....	27
Ventral:				
Distance from snout	.....	32	.....	30
Length	.....	20	.....	21
Branchiostegals	VI	.....	VI	.....
Dorsal	IX, 18	.....	X, 17	.....
Anal	15	.....	14	.....
Caudal	+, 12, +	.....	.....	.....
Pectoral	17	.....	Right 18 Left 17	.....
Ventral	I, 3	.....	I, 3	.....

20. Cottus scorpioides Fabr.

Cottus scorpioides FABR., Faun. Grönld.: LÜTKEN, Aftryk af Videnskabelige Meddelelser fra den naturhistoriske Forening Kjöbenhavn, 1876, p. 12.

21744. 7 specimens. Cumberland Gulf, A. L. Kumlien.

21745. 4 specimens. Lat. 66° 24′ N., long. 68° 49′ W. A. L. Kumlien.

21750. (670.) Young. Head of Cumberland Gulf. A. L. Kumlien.

22327. (180.) ♀ adult. Cumberland Gulf. A. L. Kumlien.

22330. (151.) Young. Niantilic, Cumberland Gulf. A. L. Kumlien.

22331. Young. Cumberland Gulf. Lieut. W. A. Mintzer.

Mr. Kumlien brought down many examples of a species of *Cottus* which closely resembles *scorpius* and *grönlandicus*, and yet agrees with

neither of them. It is a species characterized by a very short head and short jaws, the head constituting only one-third of the total length without the caudal, and the upper jaw equalling less than one-seventh of the same length. The length of the upper jaw of *C. grönlandicus* equals slightly more than one-sixth of the total length without caudal, and in *C. scorpius* it is contained only 5⅓ times in the length exclusive of the caudal. The species agrees with Fabricius's description and with Dr. Lütken's diagnosis of *Cottus scorpioides*. For the sake of comparison, I have prepared a table of measurements of the head and jaws of 9 additional specimens of *C. grönlandicus* to follow the measurements of *C. scorpioides*. The unit of length in the tables is the total length to the origin of the middle caudal rays.

Description.—The shape of the body resembles that of *Cottus scorpius* L., but the caudal peduncle is longer and more slender.

The greatest height of the body, which is at the ventrals, equals the distance from the tip of the snout to the nape, and is contained 4⅓ times in the length without caudal. The caudal peduncle is slender and long; its least height is less than the long diameter of the orbit, and its length to the origin of the middle caudal rays equals the length of the longest anal ray.

The length of the head, measured to the end of the opercular flap, is contained 3 times in the unit of length. The width of the head at the base of the præopercular spines equals the distance from the snout to the nape, and nearly equals the length of the anal base. The long diameter of the eye equals half the length of the upper jaw, and is very little less than the length of the snout. The distance between the eyes equals ⅛ of the length of the mandible, and is contained 20 times in the unit of length. The length of the snout equals ½ the length of the mandible, and is contained 14 times in the unit of length.

The distance of the spinous dorsal from the snout equals twice the length of the longest ray of the second dorsal and is nearly or quite equal to the length of the head. The first spine is contained 11 times, the second 9½ times, and the third, fourth, and fifth 9 times in the unit of length. From this point the spines diminish gradually in length to the last, which is ⅓ as long as the first. The longest ray of the second dorsal is contained 6¼ times in the unit of length.

The distance of the anal from the snout equals twice the length of the pectoral. The anus is directly under the origin of the second dorsal.

The length of the anal base is about equal to the distance from the

snout to the nape. The first and last rays are usually equal in length, and equal the length of the snout. The longest anal ray equals in length the caudal peduncle.

The length of the middle caudal rays is contained from 5 to 6 times in the unit of length.

The distance of the pectoral from the snout is contained 3⅓ times, and its length 3⅓ to 4 times in the unit of length.

The distance of the ventral from the snout equals twice the length of the upper jaw. The length of the ventral in females is contained 5 times (in one nearly 6 times) in the unit of length; in males, about 4⅓ times.

Radial formula.—B. VI; D. IX–X, 15–16; A. 11–13; P. 15–16; V. I, 3.

Dr. Lütken is of the opinion that "*Cottus pachypus* Günther (from Port Leopold) is the genuine *C. scorpioides*," in which opinion I fully coincide after a comparison of Mr. Kumlien's specimens with Fabricius's description of *C. scorpioides* and the description of *C. pachypus*.

Cottus scorpioides appears in Professor Gill's List of East Coast Fishes with a doubt as to its reference to the genus *Cottus*, to which genus, however, it was properly referred by Fabricius.

Table of Measurements.

Species, *Cottus scorpioides* Fabr.

Current number of specimen	21,745 *a*.		21,745 *b*, ♂.		21,745 *c*, ♀.	
Locality	Lat. 66° 24′ N. Long. 68° 40′ W.					
	Millimetres.	100ths of length.	Millimetres.	100ths of length.	Millimetres.	100ths of length.
Extreme length	101					
Length to origin of middle caudal rays	83		115		115	
Body:						
Greatest height		22				
Height at ventrals		22				
Least height of tail		6		6		
Length of caudal peduncle				13		13
Head:						
Greatest length		33		33		33
Distance from snout to nape		23				24
Greatest width		23				
Width of interorbital area		5				5
Length of snout		7		8		8
Length of maxillary		13		14		13
Length of mandible		16		16		15⅓
Diameter of orbit		8		7		7⅓
Dorsal (spinous):						
Distance from snout		32		33		33
Length of base		21				
Length of first spine		8				
Length of second spine		9				
Length of third spine		10				
Length of fourth spine		10				
Length of fifth spine		10				
Length of sixth spine		10				
Length of seventh spine		9				
Length of eighth spine		7				
Length of ninth spine		5				
Length of longest ray		16				

Table of Measurements—Continued.

Species, *Cottus scorpioides* Fabr.

Current number of specimen	21,745 *a*.		21,745 *b*, ♂.		21,745 *c*, ♀.	
Locality	Lat. 66° 24′ N. Long. 68° 49′ W.					
	Millimetres.	100ths of length.	Millimetres.	100ths of length.	Millimetres.	100ths of length.
Anal:						
Distance from snout		60		60		61
Length of base		24				
Length of first ray		8				
Length of longest ray		13				
Length of last ray		8				
Caudal:						
Length of middle rays		21				
Pectoral:						
Distance from snout		31		30		
Length		29		30		
Ventral:						
Distance from snout		29		29		26
Length		21		23		17
Branchiostegals	VI					
Dorsal	IX, 16		X, 16		IX, 16	
Anal	13		12		13	
Pectoral	15		16		16	
Ventral	I, 3		I, 3		I, 3	

Current number of specimen	21,745 *d*, ♀.		22,327, ♀.		Averages.
Locality	Lat. 66° 24′ N. Lon. 68° 49′ W.		Cumberland Gulf.		
	Millimetres.	100ths of length.	Millimetres.	100ths of length.	100ths of length.
Extreme length			223		
Length to origin of middle caudal rays	102		190		
Body:					
Greatest height				23	23
Greatest width				22	
Height at ventrals				23	23
Least height of tail		6		5½	6
Length of caudal peduncle		14			13
Head:					
Greatest length		33		32	33
Distance from snout to nape		23		23½	23
Greatest width				22	23
Width of interorbital area		5		5½	5
Length of snout		7		7½	7½
Length of maxillary		14		14	13½
Length of mandible		15		15	15½
Distance from snout to orbit				8	
Diameter of orbit		7		7	7
Dorsal (spinous):					
Distance from snout		31		30	32
Length of base				27	
Length of first spine				10	9
Length of second spine				11	10½
Length of third spine				11½	11
Length of fourth spine				11½	11
Length of fifth spine				11½	11
Length of sixth spine				10½	10
Length of seventh spine				9	9
Length of eighth spine				7	7
Length of ninth spine				5	5
Length of tenth spine				3	3
Length of longest ray				16	16
Length of last ray				6½	
Anal:					
Distance from snout		61		61	61
Length of base				23	23½
Length of first ray				7½	7½

Table of Measurements—Continued.

Species, *Cottus scorpioides* Fabr.

Current number of specimen	21,745 *d*, ♀.		22,327, ♀.		Averages.
Locality	Lat. 66° 24′ N. Lon. 68° 49′ W.		Cumberland Gulf.		
	Millimetres.	100ths of length.	Millimetres.	100ths of length.	100ths of length.
Anal:					
Length of longest ray	.....	.....	.....	12½	13
Length of last ray	.....	.....	.....	7	7½
Caudal:					
Length of middle rays	.....	.....	.....	17	19
Pectoral:					
Distance from snout	.....	30	.....	30	30
Length	.....	27	.....	25	28
Ventral:					
Distance from snout	.....	29	.....	29	28
Length	.....	20	.....	18	20
Branchiostegals	.....	.....	VI	.....	.....
Dorsal	IX, 15	.....	X, 16	.....	.....
Anal	11	.....	12	.....	.....
Pectoral	16	.....	16	.....	.....
Ventral	I, 3	.....	I, 3	.....	.....

Species, *Cottus scorpius* sub-species *grönlandicus*.

Current number of specimen	22,272 *a*.		22,272 *b*.		22,272 *c*.	
Locality	Bucksport, Me.		Bucksport, Me.		Bucksport, Me.	
	Millimetres.	100ths of length.	Millimetres.	100ths of length.	Millimetres.	100ths of length.
Extreme length without caudal	71	.....	75	.....	72	.....
Length to end of middle caudal rays	87	.....	91	.....	88	.....
Head:						
Greatest length	.....	40	.....	39	.....	39
Length of upper jaw	.....	18	.....	17½	.....	18
Length of mandible	.....	21	.....	19	.....	19½

Current number of specimen	22,272 *d*.		22,272 *e*.		22,272 *f*.	
Locality	Bucksport, Me.		Bucksport, Me.		Bucksport, Me.	
	Millimetres.	100ths of length.	Millimetres.	100ths of length.	Millimetres.	100ths of length.
Extreme length without caudal	63	.....	64	.....	66	.....
Length to end of middle caudal rays	76	.....	79	.....	80	.....
Head:						
Greatest length	.....	40	.....	39	.....	39
Length of upper jaw	.....	17	.....	17	.....	17
Length of mandible	.....	20	.....	20	.....	19

Current number of specimen	22,272 *g*.		22,272 *h*.		22,272 *i*.	
Locality	Bucksport, Me.		Bucksport, Me.		Bucksport, Me.	
	Millimetres.	100ths of length.	Millimetres.	100ths of length.	Millimetres.	100ths of length.
Extreme length without caudal	58	.....	51	.....	57	.....
Length to end of middle caudal rays	71	.....	63	.....	70	.....
Head:						
Greatest length	.....	40	.....	40	.....	39
Length of upper jaw	.....	17	.....	18	.....	17½
Length of mandible	.....	19	.....	21	.....	19

21. Cottus quadricornis Linn.

Cottus quadricornis RICH., Last Arc. Voy., 1855, pp. 348–9: GÜNTH., P. Z. S., 1877, p. 293.

Richardson records the species from the Coppermine River region and Coronation Gulf (68° 30′ N., 110° W.).—*Günther.*

22. Cottus polaris Sabine.

Cottus polaris RICH., Last Arc. Voy., 1855, p. 351.

Richardson refers to this species as occurring at North Georgia, lat. 75° N., and at the Peninsula of Boothia. The radial formula appears to me more like that of a *Centridermichthys* than anything else, but the genus to which it properly belongs is uncertain.

23. Gymnacanthus pistilliger (Pall.) Gill, MS.

Cottus ventralis CUV. & VAL., Hist. Nat. Poiss., iv, p. 194: COLLETT, Christiania Vid. Selsk. Forh. 1878, No. 14, (p. 15).

21732. (1373.) Godthaab, Disko Id., Greenland, A. L. Kumlien. D. XII, I, 16. A. 18. V. 3. Ventrals nearly reach vent.

21733. (1374.) Godthaab, A. L. Kumlien. D. XII, 15. A. 19. V. 3. Ventrals reach fifth ray of anal.

21734. Godthaab. A. L. Kumlien. D. XI, 16. A. 18. V. 3. Ventrals extend little more than half way to vent.

21735. Godthaab. A. L. Kumlien. D. XI, 17. A. 18. V. 3. Ventrals reach third ray of anal.

21736. Godthaab. A. L. Kumlien. D. XII, 17. A. 19. V. 3. Ventrals nearly reach vent.

21737. Godthaab. A. L. Kumlien. D. XII, I, 15. A. 18. V. 3. Ventrals reach fourth ray of anal.

21741. (151.) Niantilic Harbor, Cumberland Gulf, A. L. Kumlien.

21743. (180.) Niantilic Harbor, A. L. Kumlien.

22332. Niantilic Harbor, Aug. 1876, Lieut. W. A. Mintzer.

17431. Christiania, Norway, M. G. Hetting, inspector of fisheries. D. XII, 14. A. 16. V. 3. Ventrals reach fourth ray of anal.

Dr. Lütken rejects the name *Gymnocanthus*, Swainson, because the genus was badly defined. There can be no difference of opinion as to the fact that the genus was poorly characterized; but there is an attempt at definition and a reference to a figure of the type-species, so that one need not hesitate as to what is intended. If we begin to reject names of genera because they are not accompanied by complete descriptions, we may find it difficult to draw the line between what we shall accept and what we shall reject. In retaining Swainson's name it may not

be amiss to reproduce his description.* Concerning the specific name *pistilliger*, Dr. Lütken says:† "Influenced by Steindachner's notice (Wien. Sitzungsb. 1876) on *C. pistilliger*, Pallas, I have sought information concerning this species in the Berlin Museum; the type is only a bad half skin preserved in spirits; Prof. Peters has been so obliging as to send it to me for investigation, and I have thereby been able to convince myself that the 'pistils' which Pallas describes as soft threads with spongy heads are in reality only the half cruciform, spiny scales which distinguish a certain part of the side of the body in *C. tricuspis*. Since the name '*pistilliger*' is thus founded on a misapprehension, its reputed priority (1811) cannot require that it be given the preference over the next in the series, and we should therefore fix upon the name *Phobetor ventralis*, Cuv. & Val." If we were to throw out all names which are based upon a misapprehension it would involve us in a great deal of unnecessary confusion, and it would be difficult to decide how far the elimination should proceed. The fact that Dr. Lütken could recognize the peculiarity in which the specific name originated is a sort of apology for its adoption by Pallas.

24. Icelus hamatus Kröyer.

Icelus hamatus GÜNTH., P. Z. S., 1877, pp. 293, 476.

This species was collected in Discovery Bay, Franklin Pierce Bay, and at Cape Napoleon, in the month of August, by Captain Feilden, and in Franklin Pierce Bay, August 11, 1875, by Mr. C. Hart.

25. Triglops pingelii Reinh.

Triglops pingelii GÜNTH., P. Z. S., 1877, p. 476.

Taken in Franklin Pierce Bay, August 11, 1875, by Mr. C. Hart, naturalist on board H. M. S. "Discovery."

The United States Fish Commission has many specimens in its collections of 1877 and 1878.

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*Nat. Hist. Fishes, Amphibians, & Reptiles, II, London, 1839, pp. 181 & 271.

p. 181. GYMNOCANTHUS. Nape of the head contracted; eyes with bony orbits.

p. 271. GYMNOCANTHUS Sw. Resembling in general aspect the last, (*Cottus claviger*, C. & V.), but there are no upper orbits; spines of the head few and naked; ventral fins very long, and of 3 rays; dorsals distinct; the rays of the first naked on their terminal half (?); caudal fin truncate.

G. ventralis, C. & V. iv, pl. 79, fig. 1.

†Aftryk af Videnskabelige Meddelelser fra den naturhistoriske Forening Kjöbenhavn, 1876, p. 10.

Family, GASTEROSTEIDÆ.

26. Gasterosteus insculptus Rich.

Gasterosteus insculptus RICH., Last Arc. Voy., 1855, p. 356, pl. xxv.

The types were from Northumberland Sound, lat. 76° 53′ N.

27. Gasterosteus pungitius Linn., sub-species **brachypoda** Bean.

In small streams on the sides of Oosooadlin Mountain, and in a little pond on the top, 1,500 feet above tide-level, Mr. Kumlien collected numerous examples of a many-spined stickleback, which resembles *Gasterosteus pungitius* Linn., in most particulars, but may be readily distinguished from it by its *very short ventral spines*. The tables of measurements and radial formulæ appended will show other differences, which are, however, not so important.

Description.—The greatest height of body is contained $5\frac{3}{4}$ times in its length to origin of middle caudal rays (in gravid females, $4\frac{1}{2}$ times); the greatest width, 10 times (in gravid females, 8 times). The height at ventrals is contained $5\frac{3}{5}$ times in length of body (in gravid females, 5 times or slightly less). The least height of tail equals half the length of the first dorsal spine. The length of caudal peduncle is $\frac{1}{7}$ of length of body.

The length of head equals 4 times the length of upper jaw, and is from $\frac{1}{4}$ to $\frac{7}{25}$ of length of body. The greatest width of head nearly equals length of middle caudal rays. The distance between the eyes equals the length of snout, which equals the length of antecedent spine of soft dorsal. The length of the operculum equals the length of ventral spine, which is slightly less than a third of length of head. The length of mandible equals the long diameter of the orbit.

The distance of the spinous dorsal from the snout is from $\frac{1}{4}$ to $\frac{3}{10}$ of length of body, and is almost uniformly less than its length of base. The first and second spines of the dorsal are equal in length, and are about $\frac{2}{3}$ as long as the ventral spine. The last spine of the dorsal is slightly less than the first. The antecedent spine of the second dorsal is somewhat longer than the first of the spinous dorsal, and half as long as the first ray following it. The first ray of the soft dorsal is contained $8\frac{1}{2}$ times in length of body, and is three times as long as the last ray.

The distance of the anal from the tip of snout equals $\frac{2}{5}$ of length of body; its length of base is twice the length of its first and longest ray, and slightly less than $\frac{1}{4}$ of length of body. The anal spine is half as long as the first anal ray (in young individuals, $\frac{2}{3}$).

The length of the middle caudal rays is contained $8\frac{1}{2}$ times in length of body; the length of external rays, $7\frac{1}{2}$ times.

The distance of the pectoral from the tip of snout is contained $3\frac{1}{3}$ times

in the total, and about equals twice its own length. When expanded, the pectoral extends usually to the 7th dorsal spine (6th to 8th).

The distance of the ventral from the tip of snout slightly exceeds $\frac{7}{25}$ of length of body. The length of the ventral spine is always a little less than $\frac{1}{3}$ of the length of the head.

Radial formula.—D. IX–XI, I, 10–11; A. I, 9–11; C. +, 12, +; P. 10; V. I, 1.

Color.—General color dull silvery, minutely punctulated with black; upper half of body with large irregular areas of black; chin, throat, and abdomen black in males, silvery in the females studied. Nilsson records a similar condition in *G. pungitius.**

The relations of *Gasterosteus pungitius* var. *brachypoda* to the *pungitius* (=*Pygosteus occidentalis* (C. & V.) Brevoort) of New England are shown in the table of comparative measurements which follows. I do not use the name *Pygosteus occidentalis*, for the reason that our many-spined stickleback bearing that name shows no characters by which it may be separated from the *Gasterosteus pungitius* of Linné as a species, and the genus *Pygosteus* has nothing to exclude it from *Gasterosteus*. The genus *Pygosteus*, although credited to Brevoort, was not defined by him; it appears in Gill's Catalogue† as a name only. The first to indicate characters by which it was thought the genus could be distinguished was Jordan; they are stated to be the following: "Dorsal spines 7 or more; sides mailed or not."‡ So far as the squamation is concerned, the collections of the United States National Museum show all sorts of individual variation, and justify the ground taken by Günther in his arrangement of the varieties of *G. aculeatus;* certainly, the squamation is not even of specific importance. The number of dorsal spines in the specimens of *G. pungitius* studied ranges from 7 to 11. In *Gasterosteus inconstans*,§ Kirtland, the range is from 3 to 6. I have seen a fresh-

* "*Variat abdomine nigro.*"—Prod. Ichth. Scand., 1832, p. 86.

† Catalogue of the Fishes of the Eastern Coast of North America from Greenland to Georgia, by Theodore Gill, Jan. 1861, p. 39.

‡ Manual of the Vertebrates of the Northern United States, 1876, p. 248.

§ *Eucalia inconstans*, Jordan, Manual of Vertebrates, 1876; Proc. Acad. Nat. Sci. Phila., 1877, p. 65. The generic characters ascribed to *Eucalia* are: (1) "Dorsal spines in a right line," which is also true in *Gasterosteus aculeatus*, L.; even in the many-spined stickleback, *G. pungitius*, I have frequently seen the last four or five spines in a right line, while the anterior ones preserved their zigzag arrangement; (2) "Ventral plates coalesced into a narrow plate on the median line between the ventral fins," just as in *G. aculeatus* and *G. pungitius*; (3) "A distinct sub-quadrate post-pectoral plate," which is present in most sticklebacks; the "associated characters" indicated contain nothing generically distinctive.

water stickleback from Maine,* which resembles *G. pungitius* in many respects, but has only 2 dorsal spines. The number of dorsal spines would seem, therefore, to be certainly of not more than specific value.

Gasterosteus nebulosus seems to me to be separated from *G. pungitius* by no constant character, but only by its habitat. *Gasterosteus mainensis* is identical with *G. pungitius*.

Apeltes (DeKay) Jordan is well separated from *Gasterosteus* by the structure of its pubic bones.

The United States National Museum has received from the Musée d'Histoire Naturelle, of Paris, one of the types of *Gasterosteus blanchardi* Sauvage, described from specimens sent from Boston, United States. This species is our common many-spined stickleback, *G. pungitius*, as will appear from the table of measurements, and the name must be regarded as a synonym of the latter. It is worthy of remark in passing that the shape of the post-pectoral plate in species of *Gasterosteus*, which has been employed as an important diagnostic character, is so variable, even on the two sides of the same fish, that it is not to be depended upon.

The sticklebacks of eastern North America, so far as observed be me, may all be referred to the genera *Apeltes* and *Gasterosteus*.

The basis of the foregoing description of the stickleback collected by Mr. Kumlien is the table of measurements which follows. Only 8 examples were measured, but these show the extremes of variation in the numerous specimens secured. In none of the individuals does the length of the ventral spine exceed one-third of the length of the head.

Mr. Kumlien has sent me the following notes on the species: "The *Gasterosteus* was taken from a pond more than a thousand feet above the sea on the mountain side. Said ponds were not over 18 inches deep, and of course freeze solid in winter. In fact, there was but very little water at the time I procured the fish. It is impossible that they could have come up from below, as the pond empties by a series of perpendicular falls, some of them 30 feet or more. In my note-book I find that they were light greenish above, barred with dusky brown and black; beneath white, irregularly blotched with black. Caudal pinkish. Male (?) with a crimson spot at base of pectoral fin."

* *Gasterosteus Atkinsii* Bean, Proc. U. S. Nat. Mus. ii, p. —.

Table of Measurements.

Current number of specimen	21,738.	21,771.	21,766.	21,768.	21,773.	21,773a.	21,773c.	21,773d.	
Locality	Cumberland Gulf.		Cumberland Gulf.		Cumberland Gulf.		Cumberland Gulf.		
	Millimetres and 100ths of length.	Millimetres and 100ths of length.	Millimetres and 100ths of length.	Millimetres and 100ths of length.	Millimetres and 100ths of length.	Millimetres and 100ths of length.	Millimetres and 100ths of length.	Millimetres and 100ths of length.	Averages.
	♂	♂	♂	♀ Gravid.	♀ Gravid.	♀ Spent.	Young.	Young.	
Extreme length to origin of middle caudal rays	48	46	47	52	56	57	28	31	.....
Length to end of external caudal rays	55	52	53	59	63	65	32	35	.....
Body:									
Greatest height	.17	.17	.175	.23	.22	.18	.17	.18	.187
Greatest width	.10	.10	.10	.13	.125	.125	.10	.08	.107
Height at ventrals	.15	.17	.17	.21	.20	.18	.16	.18	.177
Least height of tail	.03	.03	.03	.03	.03	.03	.04	.04	.032
Length of caudal peduncle	.15	.135	.14	.14	.14	.14	.14	.14	.14
Head:									
Greatest length	.275	.27	.28	.25	.25	.25	.27	.28	.265
Greatest width	.11	.11	.12	.12	.115	.115	.11	.11	.113
Width of interorbital area	.06	.06	.065	.06	.06	.06	.065	.06	.06
Length of snout	.06	.06	.065	.06	.06	.06	.065	.06	.06
Length of operculum	.08	.08	.09	.08	.08	.08	.08	.09	.08
Length of upper jaw	.07	.07	.07	.06	.06	.06	.07	.07	.066
Length of mandible	.08	.08	.08	.07	.07	.07	.08	.08	.076
Diameter of orbit	.07	.07	.075	.07	.07	.07	.08	.08	.073
Dorsal (spinous):									
Distance from snout	.29	.27	.28	.27	.25	.26	.28	.31	.276
Length of base	.30	.32	.30	.33	.34	.34	.29	.27	.31
Length of first spine	.06	.05	.055	.....	.05	.95	.06	.06	.057
Length of second spine	.06	.05	.06	.06	.055	.06	.06	.06	.058
Length of last spine	.05	.045	.04	.05	.045	.05	.05	.06	.05
Dorsal (soft):									
Length of base	.25	.26	.26	.24	.25	.25	.24	.25	.25
Length of antecedent spine	.06	.055	.055	.06	.055	.06	.07	.07	.06
Length of first ray	.12+	.12+	.12	.13	.12	.12	.12	.12	.12
Length of longest ray	.13	.12+	.12	.13	.12	.12	.12	.12	.12
Length of last ray	.05	.04	.03	.....	.045	.04	.....	.....	.04
Anal:									
Distance from snout	.60	.57	.50	.63	.60	.63	.60	.57	.60
Length of base	.22	.25	.24	.24	.23	.24	.22	.24	.235
Length of first spine	.06	.06	.06	.06	.06	.05	.08	.08	.064
Length of first ray	.12	.125	.125	.12	.12	.11	.....	.12	.12
Length of longest ray	.12	.125	.125	.12	.12	.11	.....	.12	.12
Caudal:									
Length of middle rays	.12	.12	.11	.12	.12	.11	.....	.12	.117
Length of external rays	.14	.14	.13	.13	.13	.14	.13	.13	.134
Pectoral:									
Distance from snout	.30	.30	.32	.30	.29	.28	.32	.29	.30
Length	.15	.16	.16	.17	.16	.155	.17	.17	.16
Ventral:									
Distance from snout	.37	.36	.37	.36	.34	.36	.34	.36	.357
Length	.09	.08	.08	.08	.08	.08	.085	.09	.083
Dorsal	ix, i, 10	xi, i, 11	x, i, 11	xi, i, 11	xi, i, 10	xi, i, 11	x, i, 10	ix, i, 10	.....
Anal	i, 9	i, 11	i, 10	i, 10	i, 10	i, 10	i, +	i, 10	.....
Caudal	v, 12, iv	+, 12, +	+, 12, +	iv, 12, iv	v, 12, v	iv, 12, iv	.....	+, 12, +	.....
Pectoral	10	10	10	10	10	10	10	10	.....
Ventral	i, 1	i, 1	i, 1	i, 1	i, 1	i, 1	i, 1	i, 1	.....

Table of Comparative Measurements.

	*Gasterosteus pungitius** Linn. (averages of 7 examples).	*G. pungitius* var. *brachypoda* Bean (averages of 8 examples).
	1000ths of length.	1000ths of length.
Body:		
Greatest height	.170	.187
Greatest width	.100	.107
Height at ventrals	.170	.177
Least height of tail	.036	.032
Length of caudal peduncle	.150	.140
Head:		
Greatest length	.265	.265
Greatest width	.110	.113
Width of interorbital area	.062	.060
Length of snout	.062	.060
Length of operculum	.084	.080
Length of upper jaw	.070	.066
Length of mandible	.080	.076
Long diameter of eye	.062	.073
Dorsal (spinous):		
Distance from snout	.286	.276
Length of base	.276	.310
Length of first spine	.066	.057
Length of second spine	.066	.058
Length of last spine	.050	.050
Dorsal (soft):		
Length of base	.245	.250
Length of antecedent spine	.080	.060
Length of first ray	.140	.120
Length of longest ray	.140	.120
Length of last ray		.040
Anal:		
Distance from snout	.570	.600
Length of base	.220	.235
Length of first spine	.086	.064
Length of first ray	.130	.120
Length of longest ray	.130	.120
Caudal:		
Length of middle rays	.110	.117
Length of external rays	.137	.134
Pectoral:		
Distance from snout	.300	.300
Length	.160	.160
Ventral:		
Distance from snout	.370	.357
Length	.121	.083

* = *Pygosteus occidentalis* (C. & V.) Brevoort, from which the averages were taken.

Table of Measurements.

Genus, *Gasterosteus.*

Current number of specimen	*Pungitius* L., 22,015 *a.*	*Pungitius* L., 22,015 *b.*	*Blanchardi* Sauvage (type) (39) 21,139.
Locality	Christiania, Norway, R. Collett.		Boston, U. S.
	Millimetres and 100ths of length.	Millimetres and 100ths of length.	Millimetres and 100ths of length.
Extreme length to origin of middle caudal rays	33	29	46
Length to end of external caudal rays	38	34	52
Body:			
Greatest height	.18	.18	.16
Greatest width	.10	.10	.09
Height at ventrals	.18	.18	.16
Least height of tail	.04	.04	.04
Length of caudal peduncle	.13	.13	.135

Table of Measurements—Continued.

Genus, *Gasterosteus*.

Current number of specimen	*Pungitius* L., 22,015 *a*.	*Pungitius* L., 22,015 *b*.	*Blanchardi* Sauvage (type) (39) 21,139.
Locality	Christiania, Norway, R. Collett.		Boston, U. S.
	Millimetres and 100ths of length.	Millimetres and 100ths of length.	Millimetres and 100ths of length.
Head:			
Greatest length	.28	.30	.28
Greatest width	.12	.13	.12
Width of interorbital area	.06	.06	.06
Length of snout	.06	.06	.06
Length of operculum	.10	.09	.08
Length of maxillary	.07	.07	.07
Length of mandible	.08	.08	.08
Diameter of orbit	.08	.08	.08
Dorsal (spinous):			
Distance from snout	.29	.30	.27
Length of base	.28	.30	.28
Length of first spine	.065	.07	.06
Length of second spine	.07	.07	.065
Length of last spine	.055	.055	.055
Dorsal (soft):			
Length of base	.26	.24	.26
Length of antecedent spine	.08	.08	.07
Length of first ray	.14	.15	.13
Length of longest ray	.14	.15	.13
Length of last ray	.04	.....	.04
Anal:			
Distance from snout	.59	.60	.56
Length of base	.24	.23	.23
Length of first spine	.09	.09	.08
Length of first ray	.14	.15	.13
Length of longest ray	.14	.15	.13
Length of last ray	.04	.....	.045
Caudal:			
Length of middle rays	.13	.13	.12
Length of external rays	.14	.15	.14
Pectoral:			
Distance from snout	.30	.32	.30
Length	.16	.17	.16
Ventral:			
Distance from snout	.37	.39	.36
Length	.13	.13	.12
Dorsal	X, I, 12	IX, I, 10	IX, I, 11
Anal	I, 10	I, 9	I, 10
Caudal	IV, 12, IV	+, 12, +	V, 12, IV
Pectoral	9	10	10
Ventral	I, 1	I, 1	I, 1

Family, MICROSTOMIDÆ.

28. Mallotus villosus (Müll.) Cuv.

Mallotus villosus RICH., F. B. A., iii, 1836, p. 187.

Signalized from Bathurst's Inlet. Mr. Kumlien mentions "small herring-like fish that enter the sound in great numbers in early spring, but soon leave. They are called 'ice-fish' by the whalers." I suppose they belong to the species named above.

Family, SALMONIDÆ.

29. Salmo salar (Linn.) Günther.

Salmo salar KUMLIEN, in lit.

Mr. Kumlien writes me that this salmon was obtained in quantities in the Cumberland waters, and that he recognized at least two species of

Salmo, but could not secure specimens that were not split or otherwise mutilated.

Salvelinus Naresi occurs there, as will be seen in the present paper.

30. Salmo Hearnii Rich.

Salmo Hearnii RICH., F. B. A., iii, 1836, p. 167.

The species was described from the Coppermine River, lat. 67° 42½′ N.

31. Salvelinus alipes (Rich.) Gill & Jordan.

Salmo alipes RICH., F. B. A., iii, 1836, p. 169: GÜNTH., P. Z. S., 1877, p. 476.

Boothia Felix (Rich.); Discovery Bay (Günth.).

32. Salvelinus nitidus (Rich.) Gill & Jordan.

Salmo nitidus RICH., F. B. A., iii, 1836, p. 171.

The species was described from Boothia.

33. Salvelinus Hoodii (Rich.) Gill & Jordan.

Salmo Hoodii RICH., F. B. A., iii, 1836, p. 173.

Richardson described it from Boothia Felix.

34. Salvelinus arcturus (Günth.) Gill & Jordan.

Salmo arcturus GÜNTH. P. Z. S., 1877, p. 294, pl. xxxii.

Dr. Günther established the species upon specimens obtained in lat. 82° 28′ N. and 82° 34′ N.

35. Salvelinus Naresi (Günther) Bean.

Salmo Naresi GÜNTHER, Proc. Zoöl. Soc. Lond., iii, 1877, p. 476, pl. L.

22000 ♀. Cumberland Gulf, Aug. 1876. Lieut. W. A. Mintzer.

22000 *a*. ♀. Cumberland Gulf, Aug. 1876. Lieut. W. A. Mintzer.

22000 *b*. ♂. Cumberland Gulf, Aug. 1876. Lieut. W. A. Mintzer.

Of this small charr, Lieutenant Mintzer secured the above-named specimens, and labelled them "Salmon Trout." The larger of the two females contains well-developed ova, some of which are free in the cavity of the abdomen. The species agrees very closely with Dr. Günther's description of *S. Naresi*. The description and table of measurements which follow will afford a means of estimating the correctness of an identification which records the species about 20 degrees south of the locality from which it was originally described.

Description.—The greatest height of the body is contained 5 times in the total length without caudal, and equals twice the length of the upper jaw. The height at the ventrals equals the distance from the tip of the snout to the nape. The least height of the caudal peduncle equals the length of the middle caudal rays.

The greatest length of the head is contained 4⅓ times in total length without caudal, and about equals twice the length of the base of the first

dorsal fin. The greatest width of the head is a little less than half its length. The distance between the eyes equals their long diameter and half the length of the mandible. The length of the snout equals half the length of the middle caudal rays. The length of the operculum equals the distance between the eyes. The length of the upper jaw is contained from 10 to 11 times in total length without caudal, and the length of the mandible $7\frac{3}{4}$ times. The distance from the snout to the orbit is $\frac{1}{4}$ or nearly $\frac{1}{4}$ of the distance from the same point to the base of the pectoral. The long diameter of the eye equals $\frac{1}{3}$ of the greatest height of the body. The teeth are arranged just as in the specimens examined and described by Dr. Günther.

The distance of the first dorsal from the tip of the snout equals $\frac{3}{8}$ of the distance of the anal from the same point, and is contained $2\frac{3}{8}$ times in total length without caudal. The length of the base of the first dorsal is contained $8\frac{1}{2}$ to 9 times in total length without caudal, and of its longest ray, 7 times.

The adipose dorsal is placed at a distance from the tip of the snout, equal to $\frac{4}{5}$ of the total length, exclusive of the caudal. Its height about equals the distance from the snout to the orbit.

The distance of the anal from the snout equals $\frac{3}{4}$ of the total length as before measured. The length of the anal base equals half the length of the head in the larger female, and $\frac{1}{10}$ of total length in the smaller. The longest ray of the anal equals twice the distance between the eyes, and the last ray equals half the length of the base of the first dorsal.

The length of the midle caudal rays is contained $2\frac{1}{8}$ times in the length of the external rays and $12\frac{1}{2}$ times in total length.

The distance from the tip of the snout to the base of the pectoral equals twice the greatest width of the head. The length of the pectoral equals the distance from the snout to the nape. The fin when extended falls short of the vertical through the origin of the first dorsal by about one-third of its own length.

The distance of the ventral from the tip of the snout equals 3 times the length of the pectoral. The length of the ventral equals $\frac{1}{8}$ of total length. The ventral terminates at a distance from the vent equal to the least height of the caudal peduncle.

Radial formula.—B. 10? to 11?; D. 13; A. 11; P. 15 to 16; V. I, 9.

Cæca pylorica.—In the larger female, 28.

The coloration cannot be made out accurately. There are a few small spots on the side of the body, which now appear white. Parr marks are

present in all the examples, and yet there is excellent reason for believing the largest specimen at least mature.

In the measurements the unit of comparison is the length to the origin of the middle caudal rays. The figure of *S. Naresi* is employed, and the agreement between that and the Cumberland Gulf specimens is striking.

Table of Measurements.

Current number of specimen	22,000, ♀.		22,000 *a*, ♀.		22,000 *b*, ♂.		Fig. of *S. Naresi* in P. Z. S., iii, 1877, pl. L.	
Locality	Cumberland Gulf.		Cumberland Gulf.		Cumberland Gulf.			
	Millimetres.	100ths of length.	Millimetres.	100ths of length.	Millimetres.	100ths of length.	Millimetres.	100ths of length.
Extreme length	139	.....	121	.....	88	.....	197	.....
Length to origin of middle caudal rays	120	.....	103	.....	74	.....	172	.....
Body:								
Greatest height	.....	20	.....	19	.....	19	.....	19½
Greatest width	.....	12	.....	10	.....	10	.....	.....
Height at ventrals	.....	17	.....	15	.....	16	.....	18
Least height of tail	.....	8	.....	8	.....	8	.....	8½
Head:								
Greatest length	.....	23	.....	23	.....	26	.....	22
Distance from snout to nape	.....	17	.....	17	.....	19	.....	.....
Greatest width	.....	11	.....	10½	.....	11	.....	.....
Width of interorbital area	.....	6½	.....	6½	.....	.....	.....	.....
Length of snout	.....	4	.....	5	.....	5	.....	5
Length of operculum	.....	6½	.....	7	.....	7	.....	6
Length of upper jaw	.....	10	.....	9	.....	10½	.....	10
Length of mandible	.....	13	.....	13	.....	14	.....	.....
Distance from snout to orbit	.....	5	.....	5½	.....	.....	.....	.....
Long diameter of eye	.....	6½	.....	6	.....	8	.....	5½
Dorsal (first):								
Distance from snout	.....	45	.....	46	.....	47	.....	46
Length of base	.....	12	.....	11	.....	12	.....	12
Length of longest ray	.....	14	.....	14	.....	16	.....	12
Dorsal (adipose):								
Distance from snout	.....	79	.....	80	.....	80	.....	80
Length of base	.....	3	.....	.....	.....	.....	.....	.....
Height	.....	5	.....	.....	.....	.....	.....	4½
Anal:								
Distance from snout	.....	75	.....	75	.....	73	.....	75
Length of base	.....	12	.....	10	.....	11	.....	10
Length of longest ray	.....	13	.....	13	.....	13	.....	12
Length of last ray	.....	5½	.....	6	.....	6	.....	5
Caudal:								
Length of middle rays	.....	8	.....	8	.....	.....	.....	8½
Length of external rays	.....	17	.....	17	.....	19	.....	18
Pectoral:								
Distance from snout	.....	22	.....	22	.....	23	.....	22
Length	.....	18	.....	17	.....	20	.....	18
Ventral:								
Distance from snout	.....	53	.....	54	.....	55	.....	54
Length	.....	12½	.....	13	.....	14	.....	12½
Vent from tip of ventrals	.....	8	.....	7½	.....	.....	.....	.....
Branchiostegals	11†	.....	10†	.....	.....	.....	11	.....
Dorsal	13	.....	13	.....	13	.....	13	.....
Anal	11	.....	11	.....	11	.....	11	.....
Pectoral	16	.....	15	.....	14	.....	.....	.....
Ventral	I, 9	.....	I, 9	.....	I, 9	.....	I, 9	.....
Number of cæcal appendages	28	.....	.....	.....	27	.....	42	.....

Family, CLUPEIDÆ.

36. Clupea harengus Linn.

Clupea harengus RICH., F. B. A., iii, 1836, p. 231.

Richardson mentions the occurrence of the herring at Bathurst's Inlet, 67° N., 109° W.

Family, SACCOPHARYNGIDÆ.

37. Saccopharynx flagellum Mitch.

Ophiognathus ampullaceus HARWOOD, Phil. Trans., 1827, p. 49, pl. 7 (*fide* Rich.).
Saccopharynx ampullaceus RICH., F. B. A., iii, 1836, p. 271.

"The individual described by Dr. Harwood, measuring four feet and a half in length, was captured in the entrance of Davis Strait, by Captain Sawyer, of the ship Harmony."—RICH., *l. c.*

U. S. NATIONAL MUSEUM, *April* 3, 1879.

SUPPLEMENTARY NOTE.—The description of a species of *Cottus* from the United States by Sauvage* has just come to my notice. The subject of the description and figure is undoubtedly the *Cottus æneus* of Mitchill.

MAY 23, 1879.

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* *Cottus* (*Acanthocottus*) *anceps* SAUVAGE, Nouv. Archiv. du Muséum d'Histoire Naturelle, Paris, Deuxième Série, Tome Premier, 1878, p. 145, pl. i, fig. xiii.

CRUSTACEA.

By S. I. Smith.

The following crustaceans were all collected in the Gulf of Cumberland.

Crangon boreas J. C. Fabricius (Phipps).

A female (No. 145) 110^{mm} in length, "Niantilic Island," September 24, 1877.

Hippolyte Grœnlandica Miers (J. C. Fabricius).

Two females: one (No. 1644) 100^{mm} in length, from stomach of *Cottus scorpius*, September 6, 1878; the other (No. 207) 80^{mm} long, from stomach of sculpin (No. 150), 1877.

Hippolyte Fabricii Kröyer.

A female (No. 537), 52^{mm} long, 7 fathoms, tide-hole, "Annanactook Island," June, 8, 1878; and a male (No. 862), 42^{mm} in length, head of Cumberland Gulf, June 29, 1878.

Gammarus locusta J. C. Fabricius (= *G. ornatus* Milne-Edwards).

"Penny Harbor, latitude 66°" (No. 225), October 4, 1877; "Arctic Island," low water (No. 65), September 13, 1877; "Annanactook Harbor" (No. 576), June 20, 1878.

Amathilla Sabini Bate and Westwood (Leach).

Head of Cumberland Gulf (No. 86); "Annanactook Harbor" (Nos. 584 and 593), 4 fathoms, June 19, 1878; (No. 585), Cumberland Gulf.

Hyperia medusarum Bate (O. F. Müller).

"Annanactook Harbor," No. 586, June 19, 1878.

Caprella septentrionalis Kröyer.

"Annanactook Harbor" (No. 583), "caught through crack in ice, 4 fathoms, on kelp," May 19, 1878; "Grave Island beach" (Nos. 626 and 627), June 27, 1878; (No. 420).

Lepas fascicularis Ellis and Solander.

Cumberland Gulf, at surface.

Balanus balanoides Stimpson.

Large well-developed specimens, of the low, Island, September 13, 1877. This and the precedi Mr. E. B. Wilson.

There is also in the collection a specimen of *Hy* 1420), from "Godthaab, Greenland, September 11 pax were specimens of *Balanus crenatus*.

ANNELIDES.

By A. E. Verrill.

ANNELIDA.

Harmothoe imbricata (L.) Malmgren.

Penny Harbor, Cumberland Gulf, low-water, October 4, 1877, lot 231. Head of gulf, on gravel beach, May 28, and June 1, 1878, lots 642, 660, and 664.

Nereis pelagica Linné.

Penny Harbor, Cumberland Gulf, lat. 66°, low-water, October 4 and 5, 1877, lots 221, 222, 237. Head of gulf, on gravel beach, May 28, 1878, lot 642.

Phyllodoce Grönlandica Œrsted (?).

A specimen in bad state of preservation. Cumberland Gulf.

Syllis, sp.

Penny Harbor, low-water, October 4, 1877. Head of Cumberland Gulf, gravel beach, low-water, May 28, 1878.

Cistenides granulata (Linné) Malmgren.

Cumberland Gulf, low-water.

Thelepus cincinnatus (Fabr.) Verrill.

Amphitrite cincinnata Fabr., Fauna Grönl., p. 286, 1780.

Thelepus circinnatus Malmgren, Nordiska Hafs-Annulater, in Öfversigt af Kongl. Vet.-Akad. Forhandl. 1865, p. 387, pl. xxii, fig. 58 (specific name incorrectly spelled).

Lumara flava Stimpson, Invert. of Grand Manan, p. 30, 1853.

Cumberland Gulf. Common on the American coast south to Cape Cod, and in deeper water as far as Long Island Sound.

Malmgren and several other recent writers have erroneously written the name of this species "*circinnatus*."

Spirorbis lucidus (Mont.) Mörch.

Very common in Cumberland Gulf, on ascidians, algæ, polyzoa, etc., low-water to 9 fathoms; Penny Harbor, October 4; Annanactook Harbor, May 20, 1878; head of the Gulf, May 28, 1878.

Spirorbis quadrangularis Stimpson.

Cumberland Gulf, low-water. One specimen.

GEPHYREA.

Phascolosoma margaritaceum (Sars) Kor. & Dan. (?).

Phascolosoma margaritaceum KOREN and DANIELSSEN, Fauna Litt. Norveg. iii, p. 135, pl. 15, figs. 43, 44, 1877.

A large specimen, about 6 inches long, from the stomach of a *Cottus*, in Cumberland Sound, September 6, 1878 (lot 1685), probably belongs to this species.

Total length 150^{mm}; diameter of body, 18^{mm}; length of proboscis from anal opening to end, 112^{mm}. Body large, round, abruptly rounded posteriorly, with a slight mammilla at the tip; anteriorly it tapers gradually into the proboscis, which is long and becomes slender toward the end. The surface appears nearly smooth to the eye, except that there are more or less irregular transverse wrinkles and slightly raised folds. Under a lens it is seen to be everywhere finely transversely wrinkled and striated, and in many parts reticulated with longitudinal wrinkles, while small, depressed, sucker-like organs are scattered over the surface of the body and base of the proboscis; at the posterior end of the body the longitudinal wrinkles become distinct grooves, converging to the tip, with rows of suckers between them, and the circular wrinkles, crossing the interspaces, are conspicuous. The proboscis is destitute of papillæ and hooks, and is smoother than the body, with faint indications of transverse lighter and darker bands of color. Tentacles numerous, slender. Internally the two dorsal retractors arise only a short distance behind the anal opening, their bases being wide apart toward the sides. The ventral retractors, arising near the middle of the body, are large and stout, with their thick bases close together, barely leaving space for the nervous cord to pass between them. Segmental organs large, thick, cylindrical, obtuse, dark brown, about 25^{mm} long and 3^{mm} in diameter; their openings somewhat in advance of the origin of the dorsal retractors and lower down on the sides. Intestine very long, forming a double coil of numerous turns, filling the posterior part of the body to the end. Generative organ voluminous, surrounding the intestine. A slender

transverse muscle passes from the rectum to the opposite side of the body, and the rectum is attached to the adjacent wall by a large bundle of muscular fibers. Muscles of the body-wall form a continuous layer, without distinct fascicles.

NEMERTINA.

Amphiporus Stimpsoni Verrill.

Ommatoplea Stimpsoni GIRARD, in Stimpson, Invert. of Grand Manan, p. 28, fig. 18, 1853.

Gravel beach, low-water, Cumberland Gulf, June 1, 1878, lot 663. "Color, deep purplish brown above, lilac beneath." Also from reef in Penny Harbor, October 5, 1877, lot 222.

Amphiporus, sp.

Body thick, depressed, somewhat tapered to both ends, 25^{mm} to 35^{mm} long, as contracted in alcohol. Head with a small roundish cluster of minute ocelli on the pale antero-lateral margins. Neck with a slightly marked transverse groove, converging backward in form of a V, on the dorsal surface. Color, in alcohol, dark bluish green; the under surface and margins of head yellowish white. In life, "bright pea-green."

Penny Harbor, Cumberland Gulf, lat. 66°, October 4, 1877, lot 225. Arctic Island, low-water, September 13, 1877, lot 66.

MOLLUSKS.

LIST OF SHELLS OBTAINED BY MR. LUDWIG KUMLIEN, NATURALIST TO THE HOWGATE EXPEDITION, 1877-78, AT POINTS IN CUMBERLAND SOUND, ARCTIC REGIONS, WEST FROM BAFFIN'S BAY.

By W. H. Dall.

The locality at which the schooner Florence, conveying the party, made her winter quarters, according to Mr. Kumlien's report, was not favorable for extensive collections in any department.

The prevalence of ice in the irregularities of the sound and other circumstances, especially the abrupt and rocky character of the shores, rendered it difficult to obtain specimens of invertebrates, which in point of fact were all collected at a few small areas of beach, some of which were a long distance from winter quarters.

Nevertheless, when the difficulties are considered, the results are very creditable to Mr. Kumlien's energy and perseverance, and are not without value for the study of geographical distribution.

The number of specimens is small; but twenty-four species are represented, some of which were also obtained by a party under Lieutenant Mintzer, U. S. N., who explored for minerals in nearly the same region a year or two previous to the visit of the Florence.

As was to be expected, none of the species are new: *Modiolaria faba* Fabr., which has almost been lost sight of by naturalists, and *Glycimeris Kurriana* Dkr., a species whose validity has been much questioned, were among the most interesting forms obtained.

The species are as follows (those with an asterisk are represented by only one or two specimens, and only *Buccinum grönlandicum* was at all numerous):

* *Ommastrephes illecebrosa*, Lesueur.

* *Buccinum glaciale*, Linné.

* *Buccinum ciliatum*, Fabr., var. *Mölleri*, Rve.

* *Buccinum humphreysianum*, Bennett (probably).

* *Buccinum belcheri*, Rve.

Buccinum tenebrosum, Hancock, (typical).
Buccinum grönlandicum, Chemn.
* *Trophon truncatus*, Ström.
Margarita umbilicalis, Brod. & Sby.
Margarita helicina, Fabr., vars.
Litorina grönlandica, Mörch.
Acmæa testudinalis, Linné.
Aeolidia papillosa, Linné.
* *Dendronotus reynoldsii*, Couthouy.
Mya truncata, Linné.
* *Glycimeris Kurriana*, Dkr. On mud flats.
Saxicava arctica, Linné.
* *Astarte borealis*, Gray; attached to kelp.
* *Turtonia minuta*, Fabr.; in nest of *Modiolaria*.
Modiolaria lævigata, Gray.
Modiolaria discors, Linné.
Modiolaria (Crenella) faba, Fabr.
Chiton (Tonicella) marmorea, Fabr.
Rhynchonella psittacea, Fischer; dead broken valves, apparently disgorged by some bird, were found on the hills at a considerable distance from the sea. They are evidently not fossil, and are probably to be found living in suitable places at low-water mark.

NOVEMBER 26, 1878.

MOLLUSCOIDS.

By A. E. Verrill.

TUNICATA.

Ascidiopsis complanata Verrill.

Ascidia complanata Fabr., Fauna Grönlandica, p. 332, 1780.—Verrill, Amer. Journ. Sci. i, p. 98, 1871, fig. 11.

Ascidia callosa Stimpson, Invert. of Grand Manan, p. 19, 1853.

Ascidiopsis complanata Verrill, Amer. Journ. Sci. iii, p. 289, pl. viii, f. 8, 1872.

Some of the young specimens are translucent pale olive; others are older, with a dark olive-brown, thicker, and rougher test. It appears to be the most common species. It is broadly attached by one side, obliquely, and both tubes are on the upper side, near one end. They are both short and broad.

Lot No. 235, Penny Harbor, Cumberland Gulf, at low-water, October 4, 1877. No. 592, head of Cumberland Gulf, attached to roots of kelp, May 19, 1878. No. 595, Cumberland Gulf, May, 1878. No. 664, head of Cumberland Gulf, on gravel beach, June 1, 1878.

Halocynthia Verrill = **Cynthia** Savigny (*non* Fabr., 1808).

The name *Cynthia* having been preoccupied, and no other tenable name having been given to the group, I propose to substitute *Halocynthia* for the typical section of Savigny's genus, characterized by the square apertures, compound tentacular appendages of the mantle, and the development of two ovaries. The other subdivisions established by Savigny appear to be of generic value, in the modern sense.

Halocynthia rustica Verrill.

Ascidia rustica Linné.—Fabricius, Fauna Grönlandica, p. 330, 1780, *pars*.

Ascidia monoceros Möller, Kröyer's Naturhist. Tidssk., vol. iv, p. 95, 1842.

Ascidia condylomata Packard, Mem. Boston Soc. Nat. Hist., i, p. 277, 1867.

Cynthia monoceros Verrill, Amer. Journ. Sci., vol. i, p. 93, 1871.

Distinguished by the irregular, unequal warts and tubercles of the surface, the larger ones mostly situated above the middle, and by the more or less prominent subconical tubercle at the summit, between the bases of the tubes. This terminal tubercle is often surmounted by several hard chitinous points, and in the young a similar point often occurs

on some of the other tubercles. The form of the body is more or less cylindrical, often two inches or more high and one in diameter, after preservation in alcohol. The tubes are terminal and divergent. Color, in life, reddish.

The very young specimens are low and nearly flat in contraction, and nearly smooth.

It is common on the Grand Banks, where it grows to a large size. It has not been found on the New England coast.

Lot No. 592, head of Cumberland Gulf, attached to roots of kelp, May 19, 1878. Both adult and young.

Halocynthia echinata Verrill.

Ascidia echinata LINNÉ.—FABRICIUS, Fauna Grönlandica, p. 331.

Cynthia echinata STIMP., Invert. of Grand Manan, p. 20, 1854.—BINNEY, in Gould, Invert. of Mass., p. 15, pl. xxiii, fig. 3360.—VERRILL, Amer. Journ. Sci. i, p. 96, 1871.

Lot No. 596, Cumberland Gulf, May 10, 1878.

Besides the two species of this genus brought home by the expedition, the following occur on the American coast north of Cape Cod: *H. pyriformis* (Rathke), Southern New England to Greenland; *H. villosa* (Fabr.), perhaps young of the preceding, Labrador to Greenland; *H. tuberculum* (Fabr.) = *Cynthia carnea* (Ag.) Verrill = *C. placenta* Packard (young), Cape Cod to Greenland; *H. pulchella* Verrill (as *Cynthia*), Eastport, Me., to Grand Banks; *H. partita* (Stimp.), Massachusetts Bay to North Carolina.

POLYZOA.

Crisia eburnea (L.) Lamouroux.

Gulf of Cumberland. One specimen.

Diastopora patina (Lam.) Smitt.

Annanactook Harbor, on *Laminaria*, 7 fathoms, May 19; and on *Halocynthia rustica*, head of Cumberland Gulf, May 5, 1878.

Alcyonidium mytili Dalyell.

Gulf of Cumberland, on algæ. Godthaab, Greenland, on carapax of *Hyas araneus*.

Gemellaria loricata (Linné) Busk; Smitt.

Gemellaria dumosa STIMPSON, Invert. of Grand Manan.

Specimens three inches high, Penny Harbor, Cumberland Gulf, low-water, October 4, 1877, lots 226 and 238, covered with fry of *Crenella faba*; same locality, May 28, 1878.

Cellaria articulata Smitt, ex Fabricius.

Salicornaria borealis Busk.

Cellaria borealis Smitt, Öfversigt af Kongl. Vet.-Akad. Förh. 1867, p. 361, tab. xx, fig. 17, 1867.

On *Halocynthia rustica*, attached to roots of *Laminaria*.

Head of Cumberland Gulf, May 19, 1878, lot 592. Some of the specimens are very young, with only a single clavate joint; others are nearly two inches high, and beginning to branch.

Membranipora Sophiæ Busk.

With the last (lot 592). Also from Annanactook Harbor, May 19, 1878, on roots of *Laminaria*, 7 fathoms.

Escharina ansata (Johnst.) Gray.

Mollia vulgaris, forma *ansata* Smitt, Översigt af Kongl. Vetenskaps-Akad. Förh. 1867, p. 14, tab. xxv, f. 78–83, 1867.

Several specimens occurred on the roots of *Laminaria*, 7 fathoms, Annanactook Harbor, May 19, 1878 (lot 597). Some agree with the var. *ansata* Smitt (*Lepralia ansata* Johnst.), but in most cases there are well-developed calcareous papillæ near the sides of the apertures as in the var. *papillata*.

I adopt the generic name *Escharina* given by Milne Edwards to a group, including the present species, in 1835 (in Lamarck, An. sans Vert., ed. 2, vol. ii, pp. 218, 230), and for which he cited *as the type E. vulgaris* (Moll.). Dr. Gray (List Brit. Animals in British Museum, p. 124, 1848) also restricted the name to the same and closely allied species. Dr. Smitt, however, united this group with *Hippothoa*, which seems to be a sufficienty distinct genus.

The restricted genus *Escharina*, as I limit it, is characterized by the well-marked median sinus of the apertures of the zoœcia, together with the lateral avicularia, usually developed near one or both sides of the apertures. The mode of growth is usually Lepralia-like, but may also be Escharine. It is therefore equivalent, or nearly so, to the genus *Schizoporella*, recently proposed by Hincks for the same typical species.

The genus *Escharoides*, proposed by Edwards in the same work, has also been incorrectly used by some writers; for although Gray restricted it, in 1848, to one of the original species, *E. coccinea* (Abildg.), thus making it equivalent, in part, to *Discopora* Smith, the last-named writer has applied it to a group, typified by *E. rosacea*, not included by Edwards. As the name should be restored, in accordance with Gray's limitation, I have proposed elsewhere the name *Escharopsis*, as a substitute for *Escharoides* of Smitt, including two Northern Atlantic species

(*E. lobata* (Lamx.)=*E. Sarsii* Smitt, and *E. ros*
Gulf of St. Lawrence. This genus, with an Es
tures much as in *Escharina*, except that the l
ated within their borders by the side of the si

Discopora Lam., following Edwards, should
D. Skenei, with median avicularia, the type o
cosa, a species closely related to *D. Skenei*, bu
cosa of Esper, a very different form, to which G
this generic name.

Celleporella hyalina (L.) Gray.

Cellepora hyalina LINNÉ.

Mollia hyalina SMITT, op. cit. p. 16, tab. xxv, f. 8

Hippothoa hyalina SMITT, Florida Bryozoa.

Very common, Annanactook Harbor, 7 fat
19, and 9 fathoms, May 20, 1878, lot 570. Per
Margarita helicina, October 4, 1877, lot 226. G
of Cumberland, May 28, 1878, lot 642, and o
572, May 19.

RADIATES.

By A. E. Verrill.

ECHINODERMATA.

Pentacta frondosa Jæger (Gunner, sp.).

Cucumaria frondosa Forbes, Brit. Starfishes, 1841.—Duben and Koren, 1844.

One large specimen, Godthaab, Greenland, August 11, 1878.

Strongylocentrotus Dröbachiensis A. Agassiz.

Penny Harbor, Gulf of Cumberland, reef at low-water, October, 4, 1877, lot 420.

Leptasterias Grönlandica Verrill.

Asteracanthion Grönlandicus Steenst.—Lütken, Oversigt over Grönlands Echinodermata, p. 29, 1857.

Head of Gulf of Cumberland, Niantilic Harbor, lot 144; low-water, September 25, 1877, lot 179; Arctic Island, lot 66; Penny Harbor, lat. 66°, at low-water, October 4, 1877, lot 224; also same locality, lot 290.

Leptasterias Mulleri Verrill, 1866.

Asteracanthion Mulleri Sars, Fauna Litt. Norveg., i, p. 56, f. 38, 39; Oversigt af Norges Echinodermer, p. 88.

Annanactook Harbor, 4 fathoms, May 19, 1878, lot 580.

Stephanasterias albula Verrill.

Asteracanthion albulus Stimpson, Invert. of Grand Manan, p. 14, fig. 5, 1853.
Asteracanthion problema Steenstrup.—Lütken, op. cit. p. 30.

Common in Cumberland Gulf. Gravel beach at the head of the gulf, etc. The only lot with the date remaining is 649, May 30, 1878. With lot 725 is the following note: "Dull lilac above, yellowish white beneath."

All the specimens are young, with the rays irregular in length and variable in number.

The genus *Stephanasterias*, proposed by me for this species several years ago, is characterized by a peculiar structure of the skeleton and spines as well as by its remarkable method of fission, so well elucidated by Dr. Lütken. When adult, there are usually six regular equal rays, such specimens becoming four or five inches in diameter. But in smaller specimens, still undergoing self division, there are usually two to four

longer rays, with three to five shorter reproduced rays on one side. The rays are rounded, and uniformly covered with small clustered spinules, arranged in divergent groups on each plate. The plates are regularly arranged, both transversely and longitudinally, and more closely united than in *Asterias* and *Leptasterias*. The plates of the ventral rows are directly united with the adambulacral, so as to leave no spaces between for the papulæ, which are, therefore, absent along the ventral surface next the adambulacral plates; on the dorsal surface they are usually arranged in pairs. The major pedicellariæ are arranged along the edges of the ambulacral grooves, and a few usually occur in the adoral angles, between the bases of the rays.

Ophioglypha nodosa Lyman.

Ophiura nodosa LÜTKEN, Addit. ad Hist. Ophiuridarum, p. 48, pl. ii, fig. 9, *a–b*, 1858.

Lot 249. Annanactook Harbor, low-water, October 7, 1877. "Color crimson."

HYDROIDA.

Sertularia argentea Ellis and Sol.

Gravel beach, head of Cumberland Gulf, low-water, May 28, 1878.

Halecium tenellum Hincks.

Gravel beach, head of Cumberland Gulf, low-water, lot 642, May 28, 1878.

Obelia, sp.

With last. Also from Penny Harbor, low-water, October 4, 1877, attached to *Acidiopsis complanata*.

ANTHOZOA.

Urticina crassicornis Ehrenberg, 1834.

Actinia crassicornis MÜLLER, Prodromus, 1776.
Tealia crassicornis GOSSE, Ann. Nat. Hist.; Actinologia Brit., p. 209, pl. iv, fig. 1.
Rhodactinia Dalii AG.—VERRILL, Revision Polyps, in Mem. Boston Soc. Nat. Hist. vol. i, p. 18, (author's copies, 1864).

Head of Cumberland Gulf, low-water, lot 667, on roots of *Laminaria*. Annanactook Harbor, May 19, 1878.

Bunodes spectabilis Verrill.

Actinia spectabilis FABRICIUS, Fauna Grönlandica, p. 342, 1780.
Bunodes stella VERRILL, Revision of Polyps Eastern Coast of U. S., in Mem. Boston Soc. Nat. Hist. i, p. 16, pl. i, figs. 1–8, 1864.

A more extensive acquaintance with this species, and a careful comparison with the description of Fabricius had, some time ago, caused me to unite my *B. stella* with the Greenlandic species (see Check-list of

Marine Invertebrata), although it had not been recorded from any locality between the Bay of Fundy and Greenland. The numerous specimens in this collection serve to confirm that conclusion.

Common at low-water in the Gulf of Cumberland (lots 179, 237, 664), Penny Harbor, October 4, lot 237. Gravel beach, head of gulf, June 1, 1878.

PORIFERA.

Two or three species of sponges, not yet determined, are in the collection. The most interesting, as well as most common one, forms elongated, erect, rather flaccid tubes, two or three inches high and .25 to .35 in diameter, open at top.

It occurred on the gravel beach, head of the gulf, attached to stones, June 13, 1878, lot 770; also in lot 643.

INSECTS.

DIURNAL LEPIDOPTERA.

By W. H. Edwards.

Family, PAPILIONIDÆ.

Sub-family, PAPILIONINÆ.

Genus, *Colias*, Fabricius.

1. C. Hecla, Lefebvre.

One female was taken at Quickstep Harbor, Gulf of Cumberland, latitude 66°. This species inhabits Southern Greenland and regions to the westward. It has been attributed to Iceland, but, as is now supposed, erroneously. It also inhabits Southern Lapland.

Mr. M'Lachlan, in his Report on the butterflies collected by the recent British Arctic Expedition, states that *C. Hecla* was taken as far north as latitude 81° 45′, at Hayes Sound; and he gives information obtained from Captain Feilden, R. N., attached to the Alert as naturalist, on the habits of Lepidoptera in these high latitudes. "During the short period when there is practically no night, butterflies are continuously on the wing, supposing the sun's surface not to be obscured by clouds or passing snow showers. That about one month in each year is the longest period in which it is possible for these insects to appear in the perfect state, and that about six weeks is the limit of time allowed to plant-feeding larvæ, during all the rest of the year the land being under snow and ice." Mr. M'Lachlan doubts if there is sufficient time in each year for the preparatory stages of the butterfly,—egg, larva, and chrysalis,—and is disposed to think that more than one year is necessary. In the northern United States, the larvæ of Colias frequently pass the winter when half-grown, or even younger, and I think it probable this is the habit of *Hecla*. From two to three weeks at the end of the short Arctic summer, and less time at the beginning in the following year, would seem to suffice for the whole round of transformations.

In Dr. Staudinger's Catalogue, *Colias Boothii*, Curtis, is put down as a synonym of *Hecla;* but, in the opinion of Mr. M'Lachlan, the two are distinct species.

It is remarkable that the collection of butterflies made by the British Expedition, between latitude 78° and 82°, well toward the Arctic Sea, should exhibit a greater number of species, namely, 5, than is known in Southern Greenland, where we are told but 4 species have hitherto been taken, and this northern series does not embrace the genus Chionobas, one or two species of which are found in Greenland. Besides *C. Hecla* and *Argynnis Polaris*, taken by Mr. Kumlien, were *Argynnis Charidea*, *Lycæna Aquilo*, and, most surprising of all, *Chrysophanus Phlæas*, a species represented throughout the northern United States under a slightly different form, *Americana*.

Family, NYMPHALIDÆ.

Sub-family, NYMPHALINÆ.

Genus, *Argynnis*, Fabricius.

1. A. Freya, Thunberg.

Two males were taken in Southwest Greenland. This species is distributed over the boreal regions of both continents; in America, from Greenland to Alaska; and it follows the Rocky Mountains as far to the south as Colorado. It is subject to very little variation.

2. A. Polaris, Boisduval.

One male was taken at Quickstep Harbor. This species is more restricted in distribution than *Freya*, and, so far as known, is limited to Northeast America, from Labrador to the Arctic Sea. It was taken by the British Expedition as far to the north as latitude 81° 52′, and by the American Expedition (Polaris) at 81° 50′. It varies much in color, and the example sent me by Mr. Kumlien is remarkably melanic on the upper surface, the hind wings especially showing scarcely any fulvous.

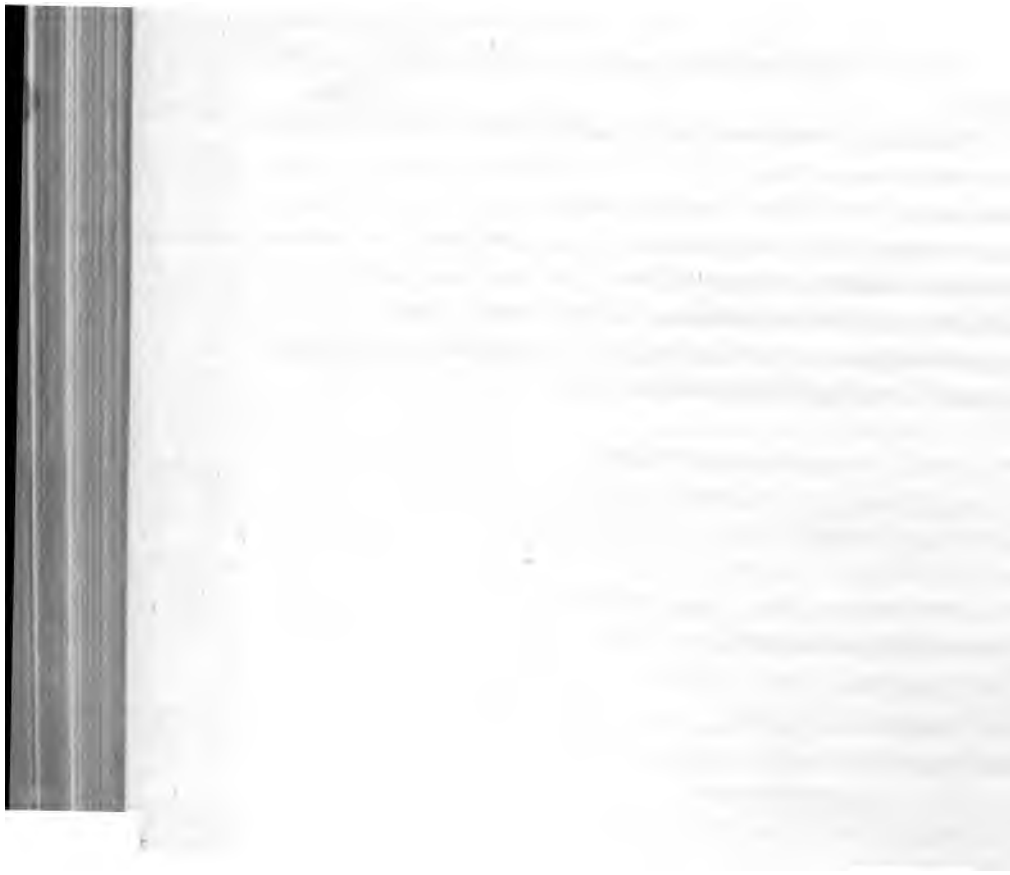
Sub-family, SATYRINÆ.

Genus, *Chionobas*, Boisduval.

1. C. Semidea, Say.
Oeno, Boisduval.

Two males were taken at Quickstep Harbor. One of these has the upper surface dark blackish-brown, and the discal belt on hind wings beneath distinctly outlined on both edges. The other is light or pale black-brown, and the belt is almost lost in the dense markings which cover the wing. But specimens from the White Mountains of New Hampshire show similar variation. This species inhabits Labrador, and the Rocky Mountains at very high altitudes as far south as Colo-

rado and New Mexico. In the White Mountains it is abundant on the summit of Mount Washington; but in the territory between this region and Labrador it is unknown, as also between Mount Washington and the Rocky Mountains. How far to the northwest of the continent it flies is not known to me. It has not appeared in collections from Alaska, in which *Freya* was represented in considerable numbers. The peculiar distribution of this species, *C. Semidea*, by which it inhabits mountain summits thousands of miles apart and not the intervening country, and in the White Mountains of New Hampshire is thoroughly isolated and restricted to a very small area, is explained as in the case of plants similarly distributed and isolated (address of Prof. Asa Gray, Dubuque, 1872). The advance to the southward of the glacial ice pushed before it multitudes of plants and animals, forcing them along very distant lines of longitude in many cases; and when the receding of the ice took place, and a milder temperature began to prevail, some species which had obtained a foothold at the south remained there, finding a climate in which they could live, upon lofty mountains only, being unable to exist in the lowlands. In the case of this butterfly, such a climate was found at or near the snow-line in the Rocky Mountains, and upon the summits of the White Mountains.



INSECTS.

HYMENOPTERA, NOCTURNAL LEPIDOPTERA, DIPTERA, COLEOPTERA, NEUROPTERA, AND ARACHNIDA.

By S. H. Scudder and others.

The insects collected by Mr. Kumlien were very few in number, amounting to only sixteen species; and they appear to add little to our previous knowledge of the fauna. Nevertheless, as all lists from high northern localities possess a certain importance, the following is given. The Hymenoptera were determined by Mr. E. T. Cresson; the report on the Lepidoptera is by Mr. A. R. Grote; Mr. E. Burgess has named the Diptera, Dr. J. L. LeConte the Coleoptera, Dr. H. Hagen the Neuroptera, and Mr. J. H. Emerton the Arachnid.—Samuel H. Scudder.

The Diurnal Lepidoptera were placed in the hands of Mr. W. H. Edwards for examination, and appear on pp. 155–157.

HYMENOPTERA.

1. No. 944. *Bombus lacustris* Cress. One specimen; American Harbor, Gulf of Cumberland, July 6, 1878.

2. No. 1287. *Bombus* sp. near *B. scutellaris* Cress., and probably *B. grœnlandicus* Smith. One specimen; Godhavn, Greenland, August 3, 1878.

3. No. 1431. *Limneria* sp. (not described). One specimen; Disko Fjord, Disko Island, Greenland, August 9, 1878.

NOCTURNAL LEPIDOPTERA.

4. *Laria Rossii* Curtis, Appendix to the Second Voyage of Sir J. Ross, lxi, Pl. A, fig. 10.

The specimens belonging to this species are (1) a dried larva, black, with yellowish brown hairs, and on each side a row of yellow tufts, arctiiform; (2) a slight cocoon formed of the larval hair like those of the genus *Orgyia*; (3) a single worn male specimen of the moth. The specimens were collected at Annanactook, Cumberland Island, the latter part

of June. The cocoon has attached to it a fragment of a lichen and several coniferous needles, and was evidently formed on the ground; these objects are merely slightly attached and form no part of the structure itself. The cocoon, which is close in texture, yet very frail and light, contains the black and shining pupa, which is unusually thickly clothed with brownish hair.

Curtis says of this species: "It is a very abundant insect, especially in the caterpillar state, for about a hundred were collected on the 16th of June 1832, near Fury Beach." His description of the larva does not well accord with the present specimen. He says: "The caterpillar is large and hairy, and of a beautiful shining velvety black, the hairs being somewhat ochreous; there are two tufts of black hair on the back, followed by two of orange." His description of the pupa and web, as well as of the perfect insect, agrees with the specimens now received. He gives the food-plant of the larva as *Saxifraga tricuspidata* and *S. oppositifolia.*

I have recorded (Psyche, 1, 131) the occurrence of this species above the tree-line on Mount Washington, N. H. It is another instance of the distribution of our existing species of moths, through the agency of the change in climate attending the Glacial Epoch.

5. No. 1431. *Anarta melanopa* (Thunb.).

A single specimen collected at Disko Fjord, Disko Island, August 9, 1878. This species has been taken above timber-line, 13,000 feet elevation, by Lieut. W. L. Carpenter, on Taos Peak, Rocky Mountains. It is found also in Labrador, and has been collected by Mr. George Dimmock near the summit of Mount Washington.

6. No. 1127.

A single specimen of a small dusky gray moth too much rubbed for positive identification and otherwise mutilated. The eyes are naked, the ocelli apparent. It was taken at Kikkerton Island, Gulf of Cumberland, July 25, 1878.

DIPTERA.

7. No. 1061. *Culex* sp. One specimen; American Harbor, Gulf of Cumberland, July 10, 1878.

8. Nos. 1061, 1127. *Tipula arctica* Curt. Two specimens; American Harbor, Gulf of Cumberland, July 10, 1878; and Kikkerton Island, Gulf of Cumberland, July 25, 1878.

9. No. 1431. *Rhamphomyia* sp., perhaps *R. nigrita* Zett. Two specimens; Disko Fjord, Disko Island, Greenland, August 9, 1878.

10. A Tachinid of unrecognizable genus; two pupa cases and a fly which has escaped from one in confinement, with crumpled wings; found parasitic on the larva of *Laria Rossii*, Annanactook, Cumberland Sound.

11. No. 12·3. *Calliphora erythrocephala* Meig. One specimen; Godthaab, Greenland.

12. No. 1098. *Scatophaga apicalis* Curt. (= ? *S. squalida* Meig.). One specimen; off shore, American Harbor, Cumberland Sound, July 13, 1878.

COLEOPTERA.

13. No. 1061. *Amara hæmatopus* Dej. (Feronia); *Stereocorus similis* Kirby. One specimen; American Harbor, Cumberland Sound, July 10, 1878. The species is found generally throughout sub arctic America.

14. No. 1641. *Agabus* (*Gaurodytes*) *tristis* Aubé. Five specimens in poor preservation; Lake Caroline Mann, Cumberland Island, September 1, 1878. The species is abundant in Alaska and extends down to California in the Sierra region.

NEUROPTERA.

15. No. 1611. A Limnophilid, perhaps an *Halesus*. Several larval cases with dried larvæ in some of them; the cases are composed of minute scales of mica. Lake Caroline Mann, Cumberland Island, September 1, 1878.

ARACHNIDA.

16. No. 1061. *Lycosa* sp., probably *L. grœnlandica* Thor. One dried specimen; American Harbor, Cumberland Sound, July 10, 1878.

PLANTS.

LIST OF THE PLANTS COLLECTED AT POINTS IN CUMBERLAND SOUND BETWEEN THE SIXTY-SIXTH AND SIXTY-SEVENTH PARALLELS OF NORTH LATITUDE AND ON THE SOUTH SHORES OF DISKO ISLAND, GREENLAND.

BY ASA GRAY.

The Howgate Expedition arrived in Cumberland Sound about the middle of September, 1877; the ground was then covered with snow, but this melted on the southern slopes some days later, and exposed a few plants still in flower, *Campanula rotundifolia*, *Lychnis apetala*, *Stellaria longipes*, var. *Edwardsii*, &c.

In the succeeding summer the Florence left her winter-harbor early in July, and while there was yet considerable snow remaining in the valleys. At the time we left our winter-quarters there were but four or five plants in flower in the vicinity, such as *Taraxacum Dens-leonis*, *Cochlearia officinalis*, *Saxifraga stellata*, and *Saxifraga rivularis*, var. *hyperborea*.

Pyrola rotundifolia, var. *pumila*, showed buds on a southern slope by the last day of May, but the same plants were not in flower by *July* 7. The season appeared to be unusually backward, frequent snow-storms prevailing till the latter days of June.

At America Harbor, on the east side, and nearly opposite Annanactook, the winter-harbor, plants were in much richer profusion and apparently more than a week earlier than at the former place.

As large a number of plants were collected here as our short stay would admit of. A few days were also spent at the Kikkerton Islands, and such of the islands as were accessible to us faithfully hunted over, but many species were not yet in flower.

On the south shores of Disko Island, Greenland, we collected for a few days in August, and here the bulk of our plant-collection was made.

Many species were found here that we had collected in Cumberland, but they were strikingly more luxuriant and generally quite abundant. In the following list the species collected at points in Cumberland Sound will be indicated by the letter C; those from Disko Island, Greenland, by the letter G.—L. K.

Thalictrum alpinum, L. G.
Ranunculus nivalis, L. C.
Ranunculus affinis, R. Br. C.
Ranunculus, not identified.
Papaver nudicaule, L. C and G.
Arabis alpina, L. G and C.
Cochlearia officinalis, L. C.
Cochlearia arctica, Schl. G.
Draba stellata, Jacq. C.
Draba stellata, var. *nivalis*, Regl. C.
Draba crassifolia, Grah. G.
Draba hirta, L. C.
Silene acaulis, L. C and G.
Lychnis alpina, L. G.
Lychnis apetala, L. C.
Lychnis affinis, Wahl. C and G.
Cerastium alpinum, L. C and G.
Stellaria longipes, Goldie.
Stellaria longipes, var. *Edwardsii*. C and G.
Arenaria peploides, L. G.
Dryas octopetala, L.
Dryas octopetala, var. *integrifolia*, Ch. & Sch.
Potentilla nivea, L. C.
Potentilla maculata, Pour. C.
Sibbaldia procumbens, L. G.
Alchemilla vulgaris, L. G.
Saxifraga rivularis, L. C.
Saxifraga rivularis, var. *hyperborea*, Hook. C
Saxifraga cernua, L. G.
Saxifraga stellaris, L. C.
Saxifraga nivalis, L. C and G.
Saxifraga cæspitosa, L. C and G.
Saxifraga tricuspidata, Retz. C and G.
Saxifraga oppositifolia, L. C.
Epilobium latifolium, L. C and G.
Archangelica officinalis, L. G.
Erigeron uniflorum, L. G.
Gnaphalium Norvegicum, Gunn. G.
Antennaria alpina, L. G and C.

Arnica alpina, Murr. G.
Taraxacum Dens-leonis, Desf. G and C.
Taraxacum palustre, DC. C.
Campanula rotundifolia, L. C and G.
Campanula uniflora, L. G.
Vaccinium uliginosum, L. C and G. (var.)
Arctostaphylos alpina, L. C and G.
Cassiope hypnoides, Don. C and G.
Cassiope tetragona, Don. C and G.
Bryanthus taxifolius, Gray. G.
Rhododendron Lapponicum, Wahl. C and G.
Ledum palustre, L. C and G.
Loiseleuria procumbens, Desv. C and G.
Pyrola rotundifolia, L.
Pyrola rotundifolia, var. *pumila*, Hook. C and G.
Diapensia Lapponica, L. C and G.
Armeria vulgaris, L. C and G.
Veronica alpina, L. G.
Euphrasia officinalis, L. G.
Bartsia alpina, L. G.
Pedicularis Langsdorffii, Fisch. G.
Pedicularis Langsdorffii, var. *lanata*.
Pedicularis hirsuta, L. C and G.
Pedicularis flammea, L. G.
Pedicularis Lapponica, L. G.
Mertensia maritima, Don. G.
Oxyria digyna, Campd. C and G.
Polygonum viviparum, L. C and G.
Empetrum nigrum, L. C.
Betula nana, L. C and G.
Salix herbacea, L. C and G.
Salix glauca, L. C.
Salix arctica, R. Br.? C.
Habenaria albida, R. Br. G.
Habenaria hyperborea, R. Br. G. New to Greenland!
Tofieldia borealis, Wahl. C and G.
Luzula spadicea, DC. C.
Luzula spadicea, var. *parviflora*, Mey. G.
Luzula arcuata, Wahl. C.

Luzula arcuata, var. *hyperborea*. C.
Eriophorum Scheuchzeri, Hoppe. C.
Eriophorum vaginatum, L. C.
Eriophorum polystachyum, L. C.
Carex lagopina, Wahl. G.
Carex rigida, Good. G.
Carex rariflora, Wahl. G.
Hierochloa alpina, L. C.
Alopecurus alpinus, L. G.
Poa alpina, L. C and G.
Festuca ovina, L. C.
Festuca ovina, var. *breviflora*. C.
Glyceria angustata, R. Br. G.
Woodsia hyperborea, R. Br. G.
Cystopteris fragilis, Bernh. G.
Aspidium Lonchitis, Sw. G.
Polypodium Dryopteris, L. G.
Equisetum arvense, L. G and C.
Lycopodium Selago, L. G and C.

LICHENS.

LIST OF LICHENS COLLECTED IN THE VICINITY OF ANNANACTOOK HARBOR, CUMBERLAND SOUND, AT ABOUT LAT. 67° N., LONG. 68° 49′ W.

By Edward Tuckerman.

Cetraria nivalis, (L.) Ach. G.
Cetraria cucullata, (Bell.) Ach. G.
Cetraria islandica, (L.) Ach. G.
Cetraria islandica, var. *Delisæ*, Br. G.
Dactylina arctica, (Hook.) Nyl. G.
Alectoria ochroleuca.
Alectoria ochroleuca, var. *cincinnata*, Fr. G.
Alectoria ochroleuca, var. *nigricans*, Ach. G.
Alectoria jubata, (L.).
Alectoria jubata, var. *chalybeiformis*, Ach. G.
Theloschistes parietinus, (L.).
Theloschistes parietinus, var. *pygmæus*, Fr. D.
Parmelia saxatilis, (L.) Fr. G.
Parmelia saxatilis, var. *omphalodes*, Fr. G.
Parmelia saxatilis, var. *panniformis*, Fr. G.
Parmelia physodes, (L.) Ach.
Parmelia physodes, var. *encausta*, Fr.
Parmelia physodes, var. *alpicola*, Nyl. G.
Parmelia stygia.
Parmelia stygia, var. *lanata*, (Mey.). G.
Parmelia conspersa, (Ehr.) Ach. G.
Parmelia centrifuga, (L.) Ach. G.
Umbilicaria vellea, (L.) Nyl. G.
Umbilicaria proboscidea, (L.) Stenh. G.
Umbilicaria proboscidea, var. *arctica*, Ach.
Umbilicaria anthracina, (Wahl.) Schœr. G.
Umbilicaria cylindrica, (L.) Delis. G.
Umbilicaria hyperborea, Hoffm. G.
Umbilicaria erosa, (Wel.) Hoffm. G.

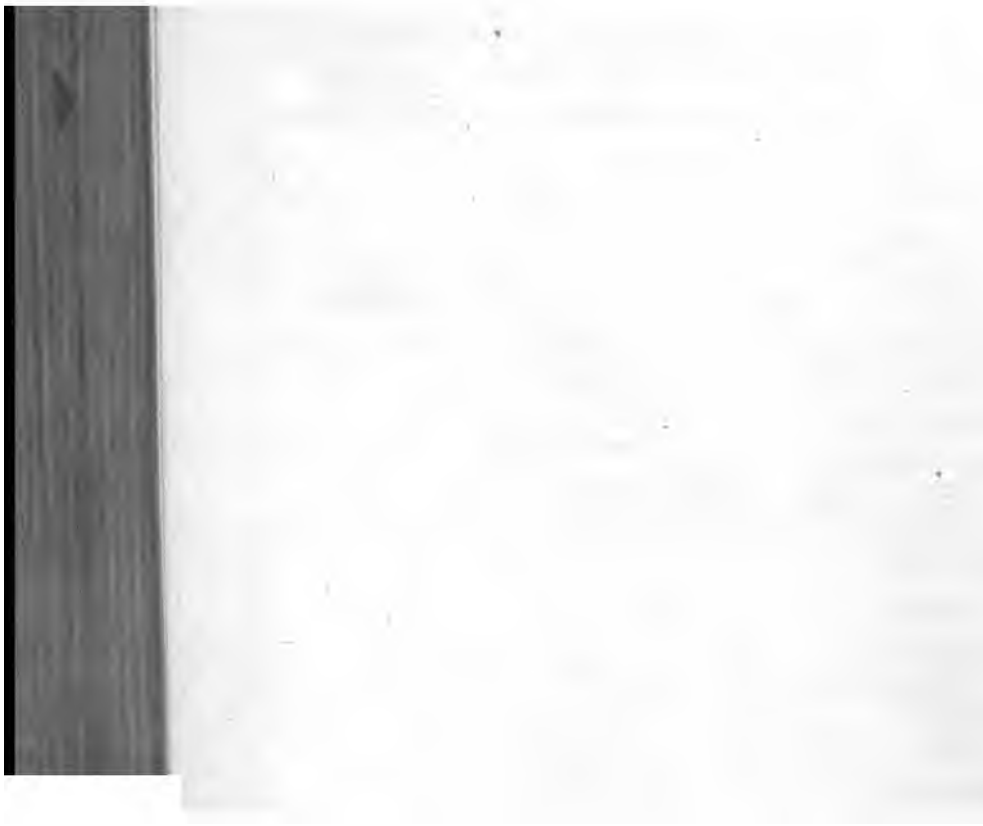
Peltigera canina, (L.) Hoffm. G.
Peltigera pulverulenta, (Tayl.) Nyl. G.
Pannaria hypnorum, (Hoffm.) Kœrb. G.
Placodium elegans, DC.
Placodium vitellinum, (Ehrh.) Hepp. G.
Lecanora rubina, (Vill.) Ach.
Lecanora rubina, var. *opaca*, Ach.
Lecanora tartarea, (L.) Ach. G.
Lecanora oculata, (Dicks.) Ach.
Lecanora ventosa, (L.) Ach. G.
Stereocaulon tomentosum, Fr.
Stereocaulon tomentosum, var. *alpinum*, Lawr.
Stereocaulon paschale, (L.) Fr. G.
Stereocaulon denudatum, Flœrk. G.
Cladonia rangiferina, (L.) Hoffm.
Cladonia rangiferina, var. *alpestris*, Schœr.
Cladonia uncialis, (L.) Fr. G.
Cladonia bellidiflora, Ach. (Schœr.). G.
Cladonia cornucopioides, (L.) Fr. G.
Cladonia cornucopioides, var. *incrassata*, Auct.
Cladonia deformis, (L.) Hoffm. G.
Heterothecium pezizoideum Ach. G.
Buellia papillata, (Sommerf.) Flot. G.
Sphærophorus fragilis, (L.) Pers.

ALGÆ.

LIST OF ALGAE COLLECTED AT POINTS IN CUMBERLAND SOUND DURING THE AUTUMN OF 1877.

By W. G. Farlow.

Odonthalia dentata.
Rhodomela subfusca.
Rhodomela tenuissima.
Polysiphonia arctica.
Delesseria rostrata.
Delesseria alata.
Rhodophyllis coccinula.
Euthora cristata.
Phyllophora interrupta.
Phyllophora membranifolia.
Ptilota plumosa, var. *serrata.*
Ceramium rubrum.
Callithamnion Pylaisæi.
Callithamnion Rothii.
Chordaria flagelliformis.
Dictyosiphon fœniculaceus.
Phlœospora tortilis.
Sphacelaria arctica.
Chætopteris plumosa.
Ectocarpus hiemalis.
Ectocarpus Farlowii.
Ectocarpus Landsburgii?
Ectocarpus firmus, var.
Monostoma ——— *?*
Cladophora arcta.
Ulothrix flacca.
Hæmatococcus lacustris (*Protococcus nivalis*).



MINERALS.

By F. M. Endlich.

The following is the catalogue of the minerals collected by Dr. Kumlien. Each one of the species is represented by a number of specimens Interesting, among them, is a collection of the supposed meteoric stones from Ovifak.

Smithsonian number.

9580. Supposed meteoric stones from Ovifak, Disko Island, Greenland.

9581. Granite, probably from a drift-bowlder, Greenland.

9582. Rose quartz. A large number of specimens from Greenland.

9583. Orthoclase, from Niantilic Gulf, Cumberland.

9584. Tourmaline, crystals with one end termination. Some of them are of considerable size. Color black. Niantilic Gulf.

9585. Muscovite, crystals and large plates. The latter contains some hematitic inclusions. Niantilic Gulf.

9586. Muscovite, crystals. Niantilic Gulf.

9587. Orthoclase, massive, yellow. Niantilic Gulf.

9588. Biotite, in small crystals. Niantilic Gulf.

9589. Quartz, colorless. Niantilic Gulf.

9590. Chalcedony, gray and blue. Disko Fjord.

9591. Argyllite, red, compact. Ovifak.

9592. Chalcopyrite, massive, in quartz. Cumberland Gulf.

9593. Pyrrhotite, associated with some pyrite. Cumberland Gulf.

9594. Smoky quartz, massive. Cumberland Gulf.

9595. Chlorite, crystallized. Cumberland Gulf.

9596. Apatite, crystalline. Cumberland Gulf.

9597. Garnet, variety, probably *Spessartite*, crystallized in clusters and single large crystals. Cumberland Gulf.

9598. Apophyllite. Small quantities associated with *Chalcopyrite*. Cumberland Gulf.

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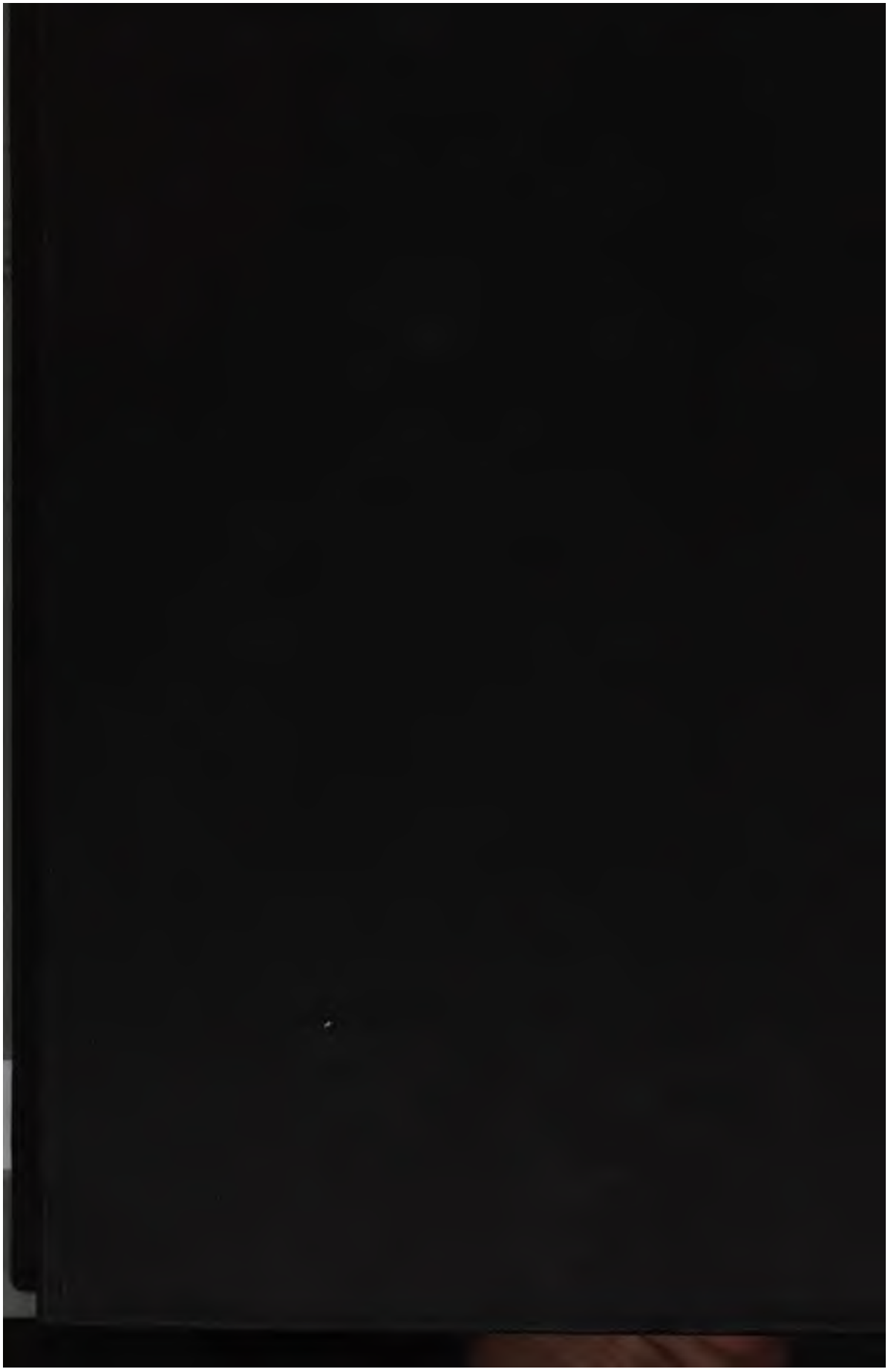
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